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From this table it will be perceived that from one-fourth to one-half of the whole mortality is to be found among children under one year of age, and it is acknowledged that in some portions of the city eighty per cent of the mortality occurs in the infant population.

Profusion of life is to be found both in the vegetable and animal kingdoms, and multitudes of individuals are destined, by some inherent vice of constitution, to droop and die prematurely. The human race in all countries is in like manner exposed to destructive agencies, especially in its infant population. Some born with inherited diseases, die at once: dentition, with its attendant evils, cuts down a multitude. So does improper and unnatural food. Scarletina and measles, and infantile fevers, enlarge the list, and bad air and insufficient clothing constantly assail the existence of those who survive these ailments. But the excessive mortality in American cities must be explained by the peculiarities of the climate.

The winters are intensely cold and the summers excessively hot. This is perilous to health. The winter promotes tendencies to coughs, and shelter, fuel and clothing are needed. The necessities of the poor compel them to resort to close and unventilated rooms to preserve warmth, and to live in filthy quarters of the city on account of their cheapness, and this brings, during the severe winters, a long train of ailments and diseases. But during the summer the children die in formidable numbers. There cannot be a question that the heat itself has much to do with the great mortality. Their nervous systems are exhausted by it, and they sink under disease. Infected atmosphere, the presence of dentition and improper food, all conspire to produce the same result. Every physician has met with instances where the removal of a child with cholera infantum, from the city to the country, has been instantly followed by convalescence. The disease has terminated as if by magic, although death was imminent, and the temperature of the two places was the same; the difference being in the purity of the atmosphere.

But since children die in the country of these diseases, fresh air alone is not enough to secure their safety, and experience has shown that diet exerts a very important influence. The proper food is the mother's milk, but when, from any cause, this cannot be supplied, cows' or goats' milk, soups or other more objectionable articles of diet are necessarily used. Cows' milk cannot always be obtained in its purity, or, if so obtained, is in danger of being spoiled by the heat of the weather. It is brought to the city from a great distance and undoubtedly multitudes of children could be saved if cows' milk could be procured fresh, or, as a substitute for this, goats' milk, as in Italy, where goats are driven into the cities and milked before the doors of consumers. In infantile diseases it must always be remembered that dentition, if present, is a grave complication. It adds to the irritability of the system, prevents sleep, destroys appetite, impedes the digestion even of the best food, and promotes the liability to diarrhoea. Clothing is another important subject for study in relation to health, espe-

REPORT.

To the Governor of the State of New York :

The Board of Health of the Metropolitan Sanitary District of the State of New York, composed of the counties of New York, Kings, Westchester and Richmond, and the towns of Newtown, Flushing and Jamaica, in the county of Queens, in accordance with the 19th section of chapter 74 of the Laws of 1866, respectfully transmits its third Report, which includes a review of its proceedings from November 1st, 1867, to October 31st, 1868.

During the year no epidemic diseases have prevailed in the District. The most notable fact has been the mortality among young children, especially of those under one year of age, and this has been so great as to arrest serious attention and to lead to the inquiry, whether the management of them is not radically wrong, and the deaths out of proportion to the known causes which exist to endanger their lives.

The following table will indicate the mortality of children under one year of age, compared with the general mortality, for every week of the year.

New York Mortality, by Weeks, 1868.

WEEK IN THE YEAR.	Mortality under one year.	Total Mortality.	WEEK IN THE YEAR.	Mortality under one year.	Total Mortality.
1st.....	164	653	27th.....	268	814
2d.....	134	441	28th.....	519	1,142
3d.....	131	444	29th.....	368	781
4th.....	100	379	30th.....	353	749
5th.....	115	402	31st.....	363	761
6th.....	124	448	32d.....	391	643
7th.....	91	448	33d.....	303	732
8th.....	132	437	34th.....	265	656
9th.....	113	482	35th.....	228	599
10th.....	130	464	36th.....	217	589
11th.....	124	412	37th.....	181	515
12th.....	126	480	38th.....	156	454
13th.....	121	463	39th.....	155	472
14th.....	143	472	40th.....	138	423
15th.....	152	509	41st.....	144	424
16th.....	105	435	42d.....	122	369
17th.....	125	453	43d.....	112	380
18th.....	104	432	44th.....	86	336
19th.....	121	440	45th.....	81	324
20th.....	115	407	46th.....	76	306
21st.....	110	408	47th.....	77	358
22d.....	86	344	48th.....	83	350
23d.....	107	392	49th.....	68	324
24th.....	107	387	50th.....	103	385
25th.....	144	427	51st.....	82	340
26th.....	147	413	52d.....	101	367

a nuisance at all. They are always ready to appear before the Courts in defense of those who are hostile to the rules established by the Board of Health, and thus create very serious obstacles to the enforcement of sanitary measures. These persons, for instance, admit in the abstract that pure air is necessary to health. They admit that the air of hospitals will generate erysipelas, fevers, gangrene and pyemia. They will concede that the emanations from human bodies, as on ships or in prisons, will produce typhus, or that the effluvia from drains which contain decomposing animal matter will lead to the same result, yet, in individual complaints, will deny that these emanations are injurious. They do not take the broad view of the subject, that atmospheric air, as the Creator made it, is the material best adapted to human beings to breathe, and that anything which interferes with its standard purity must depress the vital powers, and cause illness and death. Again, these same persons will admit that some disinfectants will arrest putrefaction, and yet, when used, they will cry out loudly against them, and assert that it is merely substituting one bad smell for another, which does no good. The Board of Health is not infallible, and is very dependent on the Medical Profession, which is constantly engaged in studying the laws of health. It invites all collaborators, and even all criticism, if inspired by a desire for truth and the public welfare.

The ignorance of all classes is a very great obstacle to all health measures, and time is required to remove opposition to them. The condition of the very poor, from the necessity they are under to content themselves with simple shelter and sustenance, precludes the hope that their aid can be obtained in studying and applying them, but the public authorities, who know that a healthy population is a public blessing, and that thickly-crowded collections of individuals, with emanations from within and without their dwellings, generate disease and disseminate it throughout the community, must do the hygienic work for them, until it can be shown that economy, domestic comfort and safety for themselves and families are promoted by the proposed changes. The Board of Health can prevent unsuitable dwellings from being built, can forbid certain cellars being occupied, can remove filth whenever found, and if power was granted it could clean the streets. But in this way the work is tedious and its object slowly attained; and its efforts would be crowned with greater and more speedy success, if preventive measures could be used.

Instead of removing from the crowded tenements the filth generated in and around them, it would be better for all to remove the over-crowded population to the neighboring country, where cheaper and better dwellings could be procured, surrounded by plots of ground and supplied with pure air and ventilation. In the spaces about the houses, a cow or goat could be kept, to furnish food for the infants, and the general comfort and well-being of the residents would soon be so well established that they would never consent to occupy unhealthy homes again. This cannot be done until means are provided by which the laboring population can return to

their work expeditiously and at little expense. Steamboats, railroads, elevated or subterraneous, to carry passengers quickly and cheaply through the city, deserve approbation and encouragement as the wisest of health measures.

The removal of filth and street cleaning are inefficiently and expensively done by the means at present employed. Raised platforms should be built at convenient places where carts could be driven and deposit their contents into cars which could be sent at once out of the city, provided the different horse-railroads could be made use of for the purpose. The expense of horses and carts could thus be saved, and no dumping grounds needed. It is surprising, considering the facilities offered by the railroads, that they have not been used for this purpose. Some modification of their charters might be necessary, but could be easily obtained, if an earnest wish were shown to use them for the purpose of street cleaning.

Much of the filth in the streets and the bad air in the cities is caused by the thousands of horses used by omnibuses, railroads, and the stables necessary for them. If the use of all these horses could be dispensed with, it would be a great aid to the public health. In this age of mechanical ingenuity, it is not too much to hope that steam in some modified form, or some motive power, like caloric or electricity, but more manageable than steam, may be applied to the transportation of passengers in public vehicles, and the day may not be remote when it will be used with safety instead of horses for private carriages.

VITAL STATISTICS AND COMPARATIVE MORTALITY OF THE METROPOLITAN DISTRICT.

The Bureau of Vital Statistics continues to maintain the large degree of confidence it justly won from all classes of our fellow citizens during the first two years of its organization. Not only has the accuracy and the classification of its records become the subject of special commendation by all who have business to transact with this Bureau of the Board, but its methodical inquiries, and systematic analysis in the branches of statistical and sanitary information that it deals with, continue to be of increasing importance to the Board and to the public. The third Annual Report by the Registrar of Vital Statistics, will be found in its usual place in this volume; and it is suitably illustrated by statistical diagrams which help to a clear understanding of some of the laws that are concerned in the ever-varying course of epidemics and the chief causes of death. This Board, the community, and the country at large, have derived special advantages from the watchful observations and practical labors of this department of sanitary work. Its methods are beginning to be widely adopted in other cities, and its influence and labors are doing much to promote sanitary knowledge.

The Registrar's report shows that 25,459 deaths occurred in the city and county of New York in the year that ended on the first of October last;

and that there were 2,015 deaths in Brooklyn in the same period. Though these totals show a slight increase in the aggregate mortality in the two cities, the increase is by no means as great as the medical officers justly feared it would be, in consequence of the increase in population and the excessive temperature of the winter and the summer. The Registrar states that no summer in the previous forty years was as hot, damp, and unhealthful as the last season. The total number of deaths by the diarrheal diseases in New York, amounted to 3,836, and the zymotic or ferment diseases amounted to 7,581. In Brooklyn the former amounted to 1,675, and the total of the latter class of deaths was 3,042. The greater portion of this lamentable mortality occurred in the hot months. And although it did not equal the amount of mortality which this class of maladies gave in the corresponding months of 1866, it was so great as to cause intense anxiety, and to lead to the adoption of vigilant measures to hold in check whatever sources of these disorders that could be reached.

In mapping out the sanitary records of mortality, and preventable causes of death in the different districts of the city of New York, the Registrar of Vital Statistics has called attention to many facts which deserve public attention, as illustrating the importance of sanitary improvements. For example, he shows that in a comparison of the sanitary experience of the past two years in the Fourth, Sixth and Seventh wards, in which, throughout the past year, there has been a greater degree of cleanliness enforced in the streets and premises than before witnessed, and by extra expenditures that have not been made in certain other wards, such, for example, as the First, Fifth and Twenty-second, which not only suffer from defective cleanliness, but from defective drainage, there has been an important change in the rates of mortality. This is shown in the subjoined table:

WARD.	1867.		1868.		LESS NO. OF DEATHS IN 1868.	
	Total No. Deaths.	Deaths by Zymotic Diseases.	Total No. Deaths.	Deaths by Zymotic Diseases.	In total Mortality.	Of the Zymotics.
Fourth	70	137	491	156	76	31
Sixth	46	25	720	184	99	90
Seventh	100	167	1,074	297	37	60
Brooklyn	100	200	999	231	15	37
					1868.	
First	96	120	127	149	Increase. 57	Decrease. 9
Fifth	60	161	642	149	Increase. 81	Decrease. 12
Twenty-second	1,356	420	1,556	499	Increase. 232	Decrease. 71

The fact that the death-rates can and do steadily decrease in such wards as the Fourth, Sixth, and Sixteenth, under the influence of sanitary care, is full of encouragement and promise; while the causes that now hinder such improvement in the First and Twenty-second wards in a sickly summer, have already been so carefully investigated that the needed reforms cannot long be delayed. The Registrar shows very conclusively that local evils, pertaining to the drainage and sewerage, and to ascertained sources of atmospheric contamination, and towards which this Board is giving its utmost efforts for sanitary improvement, are chargeable with the excess of mortality that occurred last summer in the wards which showed least improvement in the death-rate.

The average death-rate in the entire city in the year ending on the 1st of October is estimated at 25.45 in the 1,000 inhabitants, or 25.450 in 1,000,000. The rate of mortality in Brooklyn is not less than 2 in 1,000 less than in New York. The Registrar's report shows how these death-rates compare with those of previous years, as well as with those of other cities.

This Board has encouraged the most searching and faithful inquiry into the removable and local causes of mortality, and it is now reaping the advantages which arise to its effective working by having the unhealthful districts under constant observation. A separate special history of deaths in tenement houses is made up week by week in the Bureau of Vital Statistics, and the number and causes of deaths in every such house constitute important elements in sanitary maps which are prepared for the use of the Board and its officers, as well as for future reference and analysis. It appears that during the nine months that have been footed up, in the present year, in a total mortality of 19,813, there were 11,571 deaths in tenement houses in which three or more families reside in apartments rented by the month; while only 4,803 deaths occurred in all other kinds of dwellings, except public institutions—in which 3,439 persons died—most of whom also were taken to those institutions from the tenement houses. By these and various other methods, in which the fatal operations of different kinds of disease are kept constantly mapped out and under close observation, the Board enjoys the advantages of such discriminating studies upon the local and preventable causes of disease as are needed by sanitary officers. Indeed the Bureau has for the past two years and upwards practically illustrated the usefulness of this kind of discriminating study of the causes of sickness and mortality, and has shown that it is entirely practicable to attain the very desirable objects regarding which a distinguished teacher of Hygiene in Europe has truly said: "We want such returns of mortality as shall show clearly the variations of the death-rate, both from epidemic diseases and other causes, and among certain limited classes of the population, and in certain limited localities, also any excess in the death-rate of these classes and localities as compared with that of the general population." The report of the Registrar shows how this end has been obtained.

ANNUAL REVIEW OF THE PROCEEDINGS OF THE BOARD FROM NOVEMBER 1, 1867, TO OCTOBER 31, 1868.

The Board having ordered the Sanitary Superintendent to cause a thorough sanitary inspection to be made of all the Common School houses and the pupils in New York and Brooklyn, and that the Sanitary Inspectors making such inspection require from each pupil a medical certificate of vaccination, and countersign the same when notified by a personal examination, the Board, on the 21st day of November, adopted a resolution requesting the Board of Education of the city of New York to co-operate in securing a thorough system of vaccination in the public schools, and to facilitate the efforts of the Sanitary Superintendent for that purpose.

An injunction having been granted by the Supreme Court, prohibiting the Board from removing the business of slaughtering animals from the densely populated portions of the city below Fortieth street, and from preventing the driving of cattle in the public streets, the Board, on the 21st day of November, directed its Attorney and Counsel to take appropriate measures for bringing before the Court of Appeals the legal points involved in the case pending against the Board relative to slaughtering and driving cattle.

Reliable information having been received that the cholera prevailed in the city of New Orleans, and the Board being of the opinion that there was danger of the same being brought to this port unless the proper quarantine regulations were enforced, a proclamation was issued on the 5th day of December, declaring the port of New Orleans to be an infected place within the meaning of the Health Laws of the State, said proclamation to continue in effect until the 21st day of February, 1868.

Communications having been received from Drs. Whitney and Carnochran and from the Eclectic Medical Society upon the subject of vaccination, the Sanitary Committee was on the 19th day of December empowered and directed to consult the best authorities in the District upon vaccination and vaccine virus. On the 10th day of March, the Sanitary Committee submitted to the Board a report containing the reply of Dr. J. P. Loines, Vaccine Physician to the Eastern Dispensary and to the Quarantine Establishment of the Port of New York, to certain questions upon the subject referred to, and the Board ordered the report to be printed.

On the 26th day of December, the Board adopted a resolution requesting the Secretary of State to direct United States Consuls to promptly communicate to this Board and to the Health Officer of the Port reliable information as to the existence at any time of infectious and contagious diseases in foreign ports. The request of the Board received immediate attention, and a circular letter of instructions upon the subject was issued by the Department of State.

George B. Lincoln, having been appointed a Sanitary Commissioner, in place of Jackson S. Schultz, resigned, took his seat as a member of the Board on the 2d day of January, 1868. Complimentary resolutions were

unanimously adopted by the Board, expressing its high estimate of his worth and services of its late President, Jackson S. Schultz, and regretting the loss to the public of so efficient and faithful an officer. On the 9th day of January, Dr. James Crane was elected President of the Board for the unexpired term of the late President.

Reliable information having been received that false certificates of death had been rendered to the Board by physicians in attendance at certain houses for the reception and boarding of infants, a resolution was adopted, on the 30th day of January, directing the Sanitary Superintendent to report all the information in his possession relative to the houses for the reception and boarding of infants; to state where they are situated and by whom kept; and to report the names of those physicians who, when children have died in those houses, have rendered false certificates to the Registrar of Vital Statistics. Subsequently, upon the evidence presented, the Board directed that suits be commenced for penalties for making incorrect returns and neglecting to make proper returns of the deaths of infants to the Board.

The Board completed, during the month of February, the consideration of the applications of the President of the Soldiers' Business' Messenger and Dispatch Company for locations for covered booths or stands on certain streets and sidewalks in the cities of New York and Brooklyn. Over two hundred applications were received, and each application applied for was personally examined by the Engineer, and detailed reports upon such location as affecting public travel and convenience, with diagrams of the premises, were presented to the Board. All parties owning or occupying property adjacent to the proposed locations were afforded an opportunity of being heard by the Board before any action was taken upon the several applications. The Board performed the duty imposed upon it in chap. 382, Laws of 1867, by determining in favor of the location of seven covered booths or stands in the city of New York, and one in the city of Brooklyn.

On the 25th day of February the Board considered a complaint against certain vessels for the storage of powder, anchored in the harbor of the city of New York, adjacent to Jersey City. After hearing the statements of the mayor and a committee of citizens of Jersey City, and of the officers of the Hazard and Dupont Powder Companies, the subject was referred to the Commissioners of the Metropolitan Fire Department, who have the right, and are charged by law with the duty of redressing all violations of law, in manufacturing, keeping or conveying gun-powder within the limits of the city of New York.

Matthew T. Brennan having been elected a Commissioner of Metropolitan Police in place of John G. Bergen, deceased, took his seat as a member of the Board on the third day of March. On the same day George B. Lincoln was elected President of the Board, in place of Dr. James Crane, who declined a re-election. Dr. Stephen Smith having been appointed a Sanitary Commissioner in place of Dr. Willard Parker, whose term had expired, took his seat as a member of the Board on the 21st day of April.

It being the duty of the Board, pursuant to section 6, chapter 956, Laws of 1867, to prepare and submit to the Legislature of 1868, plans and recommendations for the building of one or two new markets to replace the Fulton, Washington and West Washington Markets, the subject was, on the 3rd day of March, referred to a special committee, consisting of Commissioners Stone, Brennan and Manierre, for examination and report, with authority to require the services of the Engineer of the Board in preparing such plans as the committee conclude should receive the approval of the Board. On the 7th day of April, the committee submitted to the Board a report and plans for a market, to be erected on the Hudson river, between Fourteenth street and Fifty-ninth street, which were approved and adopted, and the Board ordered that the same be transmitted to the Legislature of the State.

Pursuant to chap. 687, Laws of 1867, which authorizes the Board of Sewerage Commissioners of the city of Brooklyn to drain land or lots in any part of that city, whenever notified in writing by the Metropolitan Board of Health, that the surface water is, or is liable to be ponded, and to remain stagnant, so as to be, or to become, a nuisance, dangerous to the public health, the Board, on the 21st day of March, and on various other occasions during the season of 1868, upon recommendation of the Engineer, and by resolution, caused notices to be served upon the said Sewerage Commissioners that certain pieces and parcels of land, dangerous to the public health on account of the stagnation of surface water, required immediate attention.

On account of the dilapidated and unsafe condition of the dock for the reception of night soil, at the foot of West Twenty-eight street, the President was, on the 14th day of April, directed to obtain from the Comptroller of the city, a suitable dock, on the west side, for the purpose referred to. At various times during the season of 1868 applications have been made by the Board, by resolution, or through its officers, to the Comptroller for a dock in place of the one at the foot of West Twenty-eight street, North river, necessarily abandoned by the scavengers, but without success.

The practice of filling sunken lots in the city of Brooklyn with garbage, and other refuse matter, received the attention of the Board, and on the 21st day of April a resolution was adopted authorizing and instructing the Commissioners resident in that city to present the subject to the Mayor and Common Council, and urge the adoption of the measures necessary in the premises.

On the 5th day of May the Board ordered that the accumulations of stable manure upon certain vacant lots near the North and East rivers, be immediately removed, and subsequently adopted a resolution requesting the Board of Metropolitan Police to enforce the Sanitary Ordinances, forbidding any pile or deposit of manure, offal, dirt, garbage or any accumulation of offensive or nauseous substances to be made upon any open space, or upon any pier within the built up portions of the cities of New York and Brooklyn.

On the 12th day of May the Board resolved, that whenever the Attorney shall be ordered to commence actions in the name of the Board, against the owner, lessee or agent of any premises, for violation of the provisions of chapter 908, Laws of 1867, known as the "Tenement House Act," a notice of fifteen days shall be given to said owner, lessee or agent, previous to the commencement of the suit. On the same day Assistant Sanitary Inspectors were appointed for the towns of Greenburg, West Farms, Morrisania, Newtown and Cortland, and for the county of Richmond.

On the 26th day of May the Board approved and adopted a circular to clergymen and others, being an abstract of the Statutes of the State of New York, relating to marriage ceremonials and the duties of persons authorized to solemnize marriages, and ordered the same to be printed for general distribution. On the same day the Sanitary Superintendent and the Assistant Sanitary Superintendent were directed to cause an inspection to be made of the public water-closets and privies in the several Ferry houses and Railroad stations in New York and Brooklyn, and to report what changes, if any, are necessary, to improve their sanitary condition.

On the 9th day of June the Sanitary Committee was directed to report what measures should be adopted by the Board to diminish the number of deaths by drowning in the Metropolitan Sanitary District. On the 23d day of June the report was submitted to the Board, and adopted, and the Committee was authorized to expend the sum necessary to carry into effect its plans for rescuing and resuscitating drowning persons. On the 14th day of July the Board adopted a resolution requesting all Ferry Companies, Steamboat Companies, and owners of steamers engaged in transporting human beings, in the Metropolitan Sanitary District, to keep apparatus for the rescue of drowning persons, such as had been approved by this Board, at all times, in some conspicuous and accessible place upon the vessels under their charge or control, and to keep a copy of the instructions for the resuscitation of the drowned conspicuously posted in the cabin, and upon the deck of such steamboat or ferryboat.

On the 30th day of June ten Assistant Sanitary Inspectors were appointed for the city of New York, and five for Brooklyn, for three months, from July 1, 1868, and an Assistant Attorney was appointed for the county of Kings. On the 3d day of July Professor Charles F. Chandler was appointed Analytical Chemist to the Board.

The Court of Appeals having sustained the action of the Board in the discharge of its duty and purpose of relieving the people of the densely populated portions of New York and Brooklyn, of the danger to health and life which are the consequences of conducting the business of slaughtering animals therein, and of driving cattle in the crowded streets and avenues of said cities, a Special Committee was appointed, on the 8d day of July, to report to the Board the proper measures to secure the removal of the business of slaughtering from that portion of the city of New York below Fortieth street. On the 23d day of July the Board directed its

Counsel, on its behalf, to agree with the counsel for the butchers upon terms for the removal of said butchers by the 1st day of January, 1869, such agreement to be submitted to the Board for its approval. On the 30th day of July the Board approved a stipulation for the removal of the business of slaughtering from below Fortieth street, on or before the 1st day of January, 1869, which stipulation was generally signed by the butchers doing business in that part of the city. The Board directed that a thorough inspection be made of all slaughter-houses within the city limits, and orders were issued for such changes and improvements as were found immediately necessary. Subsequently the Sanitary Committee was directed to examine that part of the island lying above Fortieth street, New York, and report to the Board as to the proper localities for the slaughtering of animals, and to consider the subject of slaughtering in the city of Brooklyn.

On the 5th day of July the Commissioners, resident in Brooklyn, were authorized to cause the removal of dead animals from the shores of Kings county, and this work was continued during the season under the immediate supervision of the Assistant Sanitary Superintendent.

The Legislature of the State, for 1868, having appropriated \$3,500 for the erection of public urinals and drinking fountains in the city of New York, said amount to be expended under the direction of the Metropolitan Board of Health, the subject was, on the 3d day of July, referred to the President and Engineer. Subsequently plans and estimates for public urinals and drinking fountains were submitted to the Board, and were approved and adopted.

During the month of July the gas nuisance received the attention of the Board, and measures were taken to secure improvements in the process of manufacturing gas by the several companies. A suit for penalties for violations of the Code of Sanitary Ordinances were ordered commenced, in the name of the Board, against the Metropolitan Gas Light Company, and an order was issued against said Company to discontinue its business until such time as the same shall be so conducted that no gases or odors detrimental to health escape into the external air. A hearing having been applied for by the Company, and the evidence in the case having been duly recorded and submitted to the Board, the order was suspended until December 1, 1868, to afford the Company time to make the necessary experiments, and decide as to the most effective method of abating the nuisance complained of.

Complaints having been received that the Scavengers frequently neglected to thoroughly disinfect the contents of vaults, sinks, privies and cesspools before removal, the Sanitary Superintendent was, on the 14th day of July, directed to require a strict compliance with the rules of the Board on that subject. Subsequently, the Sanitary Committee was authorized to purchase the necessary disinfectants for experimenting, as to the most effective material and method for the disinfection of privies. On the 28th day of July, a resolution was adopted that no permits to empty privies be granted to Scavengers during the warm weather of this year,

except, in cases where the condition of the privy, from leaking or overflowing, render it absolutely necessary that such permission should be granted.

With a view to render the work of disinfection, cleaning and repairs more effective, a special *Committee on Disinfection* was appointed on the 23d day of July, to supervise that department, to report to the Board the kinds of disinfectants to be used, the amounts to be kept in store, and the methods of their application, and to report weekly the progress of the work and the changes and improvements deemed necessary. This Committee was also authorized to disinfect the more filthy streets of the city of New York.

On account of the frequent complaints against the fat-melting establishments of this city, the Board, on the 9th day of July, revoked all permits issued for the continuance of that business, and ordered a thorough inspection of the several establishments and of the machinery in use in the same. On the 28th day of July, nine permits were granted to conduct the business of fat-melting in closed steam tight tanks *only*, between the hours of six o'clock in the morning and six o'clock of the following evening.

The Officers of the Board having, immediately upon the appearance of the Cattle Disease, commenced an investigation of the subject, the Sanitary Committee was, on the 11th day of August, authorized and empowered to employ four officers of the Board to act under the orders of said Committee in continuing the investigation. On the 18th day of August, a resolution was adopted requesting the Governor of the State, in view of the wide-spread disease among cattle in the Western States, to enforce such sanitary and quarantine regulations as he may be empowered to do, under the statutes, throughout the State, at the points best adapted to control the movement of cattle destined for market. Dr. Moreau Morris, Assistant Commissioner, under chapter 740, Laws of 1866, having found it necessary to establish quarantine yards in this city, for the purpose of securing the needed sanitary inspection of all cattle coming within the city limits, the Board, on the 1st day of September, by resolution, approved of his official action and requested the Commissioners of Metropolitan Police to enforce strict obedience to the orders and regulations established concerning such quarantine inspection. The Sanitary Committee, from time to time, reported to the Board the progress of the investigation in respect to the Cattle Disease, and the measures adopted to limit its extent and virulence, and to prevent the sale of diseased meat.

On the 13th day of August, the Board adopted an Ordinance, that no offal or butcher's refuse shall be conveyed through the streets or avenues of New York or Brooklyn, except at certain hours in the morning and evening, and that the same shall be conveyed in tight boxes, barrels or vessels, from which no odor shall escape. On the 20th day of August, section 99 of the Code of Sanitary Ordinances was so amended as to limit the hours for the removal of stable manure; and section 161 was so amended as to prohibit all persons from allowing cross and dangerous

dogs to run at large in the streets and public places of the District. On the same day an additional Sanitary Ordinance, pursuant to chapter 700, Laws of 1867, was adopted, designating the streets and avenues in the city of New York, through which it shall be lawful to drive cattle, sheep, swine, pigs and calves, during the hours named in the statute, and the number to be driven together, with other necessary restrictions upon the manner of conducting the business.

On the 20th day of August it was, by resolution, made the duty of the Sanitary Superintendent in New York and the Assistant Sanitary Superintendent in the city of Brooklyn to report to the Board, for its action, the name and position, with the facts as to danger to health therefrom, and the names of the owners and consignees of any vessel that has come within less than three hundred feet of any dock, in either of said cities, without first having obtained a permit from this Board. During the year, several vessels, which were believed to endanger the public health, were sent, by order of the Board, from the vicinity of New York and Brooklyn, to the lower Quarantine.

On the 8th day of September the Board directed that the execution of its orders, by, and under the direction of the Sanitary Superintendent, be discontinued, and that actions for penalties be commenced by the Attorney, in the name of the Board, in all cases in which its orders are not complied with.

On the 29th day of September the Board referred the subject of the Inspection of Food to a Special Committee, for examination and report. Upon the recommendation of this Committee, the Sanitary Superintendent was, on the 6th day of October, directed to investigate and report upon the quality of the various kinds of flour and other ingredients employed in making bread, and the adulterations of the various breads offered for sale in the city of New York. The Analytical Chemist and Deputy Registrar of Vital Statistics were directed to make the necessary chemical and microscopical examinations of flour, bread and ingredients furnished to them for that purpose by the Sanitary Superintendent.

ORDERS OF THE BOARD.

The orders of the Board for the abatement of nuisances are based upon the reports of its Sanitary Inspectors, and of the members of the Sanitary Company of Metropolitan Police. Such of these reports as require the action of the Board are forwarded by the Sanitary Superintendent to the Attorney for an endorsement of the proper order in legal form, or to the Engineer, if any construction or drainage is necessary to abate the nuisance. The complaint and proof in each case having been presented to the Board, the orders are entered usually in the form recommended by the Attorney and Engineer. The number of orders issued during the year 1868 is less than any previous year since the organization of the Board. This fact is due to the more general observance of its sanitary rules and regulations

by the owners and leases of tenement houses and dwellings, and to the general readiness of all parties to comply with the suggestions of the Sanitary Inspectors, without order or notice from the Board. The enforcement of the Tenement House Act, by suits for penalties, has also materially lessened the number of orders heretofore necessarily issued. During the year ending October 31st, 1868, the number of orders issued by this Board was eight thousand five hundred and ninety-one. Of this number one thousand two hundred and eighty-seven orders were issued under the *first* subdivision of section 14 of chap. 74, Laws of 1866, by the terms of which the party served is allowed three days in which to demand a "hearing" by the Board of the testimony which may be presented to show that the order should be modified or revoked. In cases where no hearing has been asked for, and the order has not been complied with, "final" orders in the original or an amended form, to the number of four hundred and twenty-six, have been issued and forwarded to the Sanitary Superintendent, or to the Board of Metropolitan Police for execution; or the Board has directed the Attorney to commence suits for penalties for non-compliance with such orders. All other written orders, in number six thousand eight hundred and seventy-eight, have been issued under the *second* subdivision of section 14, of chap. 74, Laws of 1866, and are of a peremptory character, requiring that the nuisance be abated within five days, and if not complied with, directing the Sanitary Superintendent to enforce the same without further notice. The following is a statement of the subjects of the orders above referred to:

Alleys cleaned.....	17	Cisterns, covers made for.....	3
Alleys disinfected.....	17	Cisterns disinfected.....	21
Alleys graded.....	4	Cisterns emptied and cleaned.....	25
Alleys paved.....	3	Cisterns filled.....	17
Alleys repaired.....	2	Cisterns repaired.....	8
Animals (dead) removed (No. of orders).....	5	Cows removed (No. of orders).....	3
Areas cleaned.....	35	Cream of Tartar manufacturing (business of) discontinued.....	1
Areas connected with sewer.....	3	Culverts made.....	1
Asnes, fish, garbage, &c., removed (No. of orders).....	675	Culverts, obstructions in removed.....	4
Bailusters repaired.....	8	Curbstones reset.....	39
Basements cleaned.....	27	Ditches cut.....	7
Basements vacated.....	1	Drains cleaned.....	9
Basements whitewashed.....	11	Drains filled.....	4
Bone and oil boiling (business of) discontinued.....	8	Drains made.....	104
Bridge repaired.....	1	Drains, obstructions in removed.....	4
Cattle yards cleaned.....	13	Drains repaired.....	61
Ceilings cleaned.....	29	Excavations filled.....	4
Ceilars cleaned.....	2-4	Fat boiling (business of) discontinued.....	20
Ceilars connected with sewer.....	31	Fire escapes constructed.....	9
Ceilars disinfected.....	195	Fence up in yard repaired.....	6
Ceilars drained.....	31	Floors (houses) repaired and relaid.....	20
Ceilars filled.....	15	Floors (privy) repaired.....	20
Ceilars graded.....	1	Floors (stable) repaired.....	10
Ceilars grates repaired.....	3	Fruits removed (No. of orders).....	3
Cesspools cleaned.....	40	Frail stands removed.....	1
Cesspools connected with sewer.....	21	Gas manufacturing (business of) discontinued.....	1
Cesspools, covers made for.....	5	Gutters constructed.....	21
Cesspools disinfected.....	21	Gutters (house) repaired.....	37
Cesspools emptied.....	32	Gutters, obstructions in removed.....	45
Cesspools filled.....	18	Gutters (sidewalk) repaired.....	8
Cesspools made.....	28	Gutters (street) cleaned.....	13
Cesspools repaired.....	10	Gutter-stones reset to the established grade.....	35
Chimneys extended.....	7	Halls cleaned.....	7
Chimneys repaired.....	33		
Chimney flues (obstructions) in removed.....	3		

Halls whitewashed.....	7	Privy-vaults connected with sewer.....	196
Hides (business of storing) discontinued.....	1	Privy-vaults filled.....	343
Holes in yard filled.....	10	Privy-vaults made.....	365
Hydrants repaired.....	34	Privy-vaults repaired.....	2
Leaders connected with sewer.....	6	Pumps (force) put up.....	2
Leaders extended.....	55	Pumps (force) repaired.....	2
Leaders (new) made.....	14	Railings made.....	3
Leaders repaired.....	161	Railings repaired.....	2
Leaders, obstructions in, removed.....	3	Roofs cleaned.....	5
Lined oil manufacturing (business of) discontinued.....	1	Roofs repaired.....	119
Lime burning (business of) discontinued.....	4	Sewers repaired.....	9
Lots cleaned.....	54	Sewer pipes constructed.....	6
Lots connected with sewer.....	41	Sewer pipes, obstructions in, removed.....	2,942
Lots disinfected.....	14	Sewer pipes repaired.....	2,255
Lots drained.....	42	Sewer pipes trapped.....	10
Lots filled.....	145	Sidewalks cleaned.....	12
Lots graded.....	196	Sidewalks repaired.....	22
Manure removed (No. of orders).....	133	Sinks disinfected.....	2
Manure depots removed.....	2	Sinks emptied and cleaned.....	2
Manure vaults cleaned.....	5	Sinks repaired.....	4
Manure vaults connected with sewer.....	5	Sky-lights repaired.....	6
Manure vaults constructed.....	132	Slaughtering (business of) discontinued.....	37
Manure vaults covered.....	132	Slaughter-houses cleaned and disinfected.....	34
Manure vaults disinfected.....	4	Spaces (vacant) cleaned.....	20
Manure vaults repaired.....	8	Spaces filled and graded.....	9
Offal removed (No. of orders).....	47	Stables cleaned.....	22
Pavements repaired.....	25	Stable floors graded.....	1
Pigs removed (No. of orders).....	2	Stagnant water removed (No. of orders).....	26
Pig pens cleaned.....	10	Stairways repaired.....	5
Pig pens disinfected.....	7	Stoops repaired.....	8
Pig pens removed.....	3	Swill boiling (business of) discontinued.....	6
Pipes (soil) repaired.....	95	Tanks repaired.....	3
Pipes (soil) obstructions in, removed.....	66	Tunnels cleaned.....	2
Pipes (waste) cleaned.....	3	Troughs removed.....	6
Pipes (waste) connected with sewer.....	25	Urinals cleaned.....	5
Pipes (waste) extended.....	10	Urinals constructed.....	10
Pipes (waste) repaired.....	79	Urinals removed.....	2
Pipes (waste) trapped.....	46	Vaults cleaned.....	4
Pipes (waste) repaired.....	66	Ventilators constructed.....	39
Plaster (loose) removed.....	1	Walls cleaned.....	53
Ponds drained.....	13	Walls repaired.....	19
Ponds filled.....	6	Walls and ceilings whitewashed.....	52
Poultices manufacturing (business of) discontinued.....	3	Water-closets cleaned.....	75
Premises cleaned.....	63	Water-closets connected with sewer.....	43
Premises connected with sewer.....	73	Water-closets constructed.....	43
Premises disinfected and fumigated.....	49	Water-closets disinfected.....	12
Premises repaired.....	8	Water-closets repaired.....	13
Privies disinfected.....	3,997	Windows made.....	3
Privies emptied and cleaned.....	3,905	Yards cleaned.....	196
Privy-houses altered.....	204	Yards disinfected.....	63
Privy-houses cleaned.....	216	Yards drained.....	3
Privy-houses constructed.....	4	Yards filled.....	10
Privy-houses disinfected.....	101	Yards graded and repaired.....	49
Privy-houses removed.....	2	Yards paved.....	10
Privy-houses repaired.....	24	Yards (stable) cleaned.....	20
Privy seats repaired.....	26		

EXECUTION OF ORDERS.

In a large majority of cases the orders of this Board for the sanitary improvement of premises, have been executed by the owners, lessees or agents; but, when such orders have been disregarded, they have been executed by the Sanitary Superintendent. The orders for scavenger work have been executed by the licensed scavengers, under the immediate supervision of the Captain of the Sanitary Company of the Metropolitan Police, at the rates established by the Board. Orders for cleaning, disinfecting and whitewashing houses and cellars, and for the removal of filth and garbage, have been executed under the supervision of the Disinfectant Department. Orders requiring structure or repairs, have been generally referred to the Engineer, and have been executed under his supervision by responsi-

ble parties, at established rates. The bills for work done in the execution of orders have been generally regarded as reasonable, and have been promptly paid. When not paid by the parties interested, they have been filed, pursuant to law, as liens upon the property upon which the work was done. The number of orders executed by the Sanitary Superintendent since the last report has been five hundred and fifty-five, and the Board has ordered that two hundred and sixteen bills for work done, be filed as liens upon the property liable for the expenses incurred.

The number of violations of the Code of Sanitary Ordinances reported during the past year has been one thousand seven hundred and seventy-six (1,776), a very large majority of which have been in the city of Brooklyn. The sanitary officers in that part of the District have been remarkably successful in securing the abatement of nuisances by complaints and preliminary notices of prosecution under the code. Full particulars in respect to the character of nuisances abated, and the disposition of cases prosecuted, appear in the report of the Assistant Sanitary Superintendent (Appendix A).

On the 8th day of September the Board directed, by resolution, that the execution of orders for the abatement of nuisances be discontinued, and that suits be commenced by the Attorney for penalties for non-compliance with its orders. The decision of the Court of Appeals affirming the legal right of the Board to make general sanitary rules and regulations, as well as the necessary orders upon any premises which are in a condition dangerous to life and detrimental to health, was the principal cause of this change in the manner of enforcing the orders of the Board. It was believed, and the result thus far justifies the belief, that the abatement of nuisances can be promptly secured by suits for penalties in cases in which the parties responsible refuse or neglect to obey the orders of the Board, and that these desired results can be obtained in this manner with the least possible expense to the public. The number of suits which the Attorney has been directed to commence in the name of the Board for penalties for non-compliance with its orders has been four hundred and seventy-two, of which four hundred and twenty-one have been against the owners or lessees of property in the city of New York, five in the city of Brooklyn, forty-one in Westchester county, four in Richmond county and one in Queens county. For particulars as to the progress and results of the suits ordered, see the report of the Attorney, in the Appendix.

ENFORCEMENT OF THE TENEMENT HOUSE ACT.

Since the last report the Attorney has been directed to commence three thousand seven hundred and fifty-six actions for penalties, in the name of this Board, against the owners, lessees or agents of tenement houses, for violations of the provisions of chap. 908, Laws of 1867, known as the Tenement House Act. Of this number, three thousand three hundred and thirty-nine suits have been ordered against owners, lessees or agents in

obstruction of natural water courses is a subject of the greatest importance, and should receive the attention of the departments charged with the construction of public streets and sewers. In the suburban and rural portions of the District the drainage is generally very defective, and this Board has frequently called the attention of the local authorities to the necessity of immediate and efficient action.

8. *Gutters and Curbstones*.—Complaints are frequent that the street-gutters are sunken and have become the receptacles of stagnant water, slops, filth and garbage. In such cases the stones have been ordered reset or relaid to the established grade, or the attention of the Street Department has been called to the nuisance complained of.

9. *Houses and Tenements*.—The inspection of the tenement houses of the District during the past year and the thorough enforcement of the "Tenement House Act" have resulted in a decided improvement in the sanitary condition of the dwellings of the poor. Cellars have been cleaned and drained, the walls frequently whitewashed, rooms ventilated, leaky roofs repaired, fire-escapes built, permanent ventilators attached to the roofs, hydrant and waste pipes repaired and connected with the street sewers, privies emptied and disinfected and provided with sewer connections, and in many cases improved water-closets have been constructed for the convenience of the several families. Particular attention is called to those parts of the reports of the officers of this Board which detail the changes and improvements in the tenement houses of this District.

10. *Hydrants, House-gutters and Leaders*.—The connection of hydrants, house-gutters and leaders with the street sewers has been uniformly required, and with the most satisfactory results. Their leaky and dilapidated condition have been subjects of frequent complaint, and have received the necessary attention.

11. *Lime and Shell Burning*.—The cities of New York and Brooklyn have been almost entirely relieved from the nuisance of lime and shell burning during the past year, and measures have been taken and will be continued to compel an entire removal.

12. *Manure, Manure Vaults, Stables, &c.*—The Board has endeavored to enforce the ordinances for the prompt removal of stable manure, and to prohibit the storage of it upon vacant lots in the vicinity of the populous portions of the District. The Sanitary Inspectors notice an improvement in the construction and drainage of stables, and in their cleanliness generally. Many new manure vaults have been constructed during the past year upon the most approved plans.

13. *Markets*.—During the past year there has been no improvement in the sanitary condition of the public markets. They are old, dilapidated,

unventilated, defective in proper drainage, and in every respect discreditable to the city of New York. The recommendation, in former reports, that this part of the public property be sold for business purposes, is renewed, and if public markets are necessary, that they be located in parts of the city more accessible to the public.

14. *Piers*.—The public piers are still distinguished for their want of cleanliness, and remain in their usual decayed and dilapidated condition.

15. *Privies*.—The condition of the privies of the District is always an important subject with reference to the public health, and has received the necessary attention. A large number have been emptied, cleaned and disinfected under the orders of the Board, and a much larger number upon suggestion or notice from the Sanitary Inspectors and members of the Sanitary Police. It has not been found necessary to make any change in the rates heretofore established for scavenging. The manner in which the work has been performed by the licensed scavengers has been the same as heretofore, but the officers of the Board have endeavored to secure a more perfect disinfection of the material, and to relieve the business of its most offensive features. The old fashioned privy vaults are rapidly giving place to water-closets, and to privies with sewer connections and the modern improvements. The Inspectors notice more attention on the part of owners and agents of property to the proper construction of privies and water-closets, as well as greater care to preserve them in a cleanly and proper sanitary condition.

16. *Rags*.—The complaints in respect to the manner of conducting the traffic in domestic rags have almost entirely ceased, and it is not known that the public health has been endangered from this cause during the past year.

17. *Sewers*.—Whenever, in the opinion of a Sanitary Inspector and the Engineer, a sewer is especially required, for sanitary reasons, in any street in this city, this Board has forwarded a request for its construction to the Croton Aqueduct Department. These requests, as well as all complaints in respect to defective or obstructed sewers, have received prompt attention. The sewerage of the cities of New York and Brooklyn is being rapidly extended by the efficient Departments in charge of the same, and this Board anticipates the most beneficial sanitary results from the extension and completion of the present system.

18. *Slaughter-houses*.—The slaughter-houses of the District have been frequently inspected, and such orders as were necessary to secure their cleanliness have been issued and enforced. It is confidently believed that during the next year they will be entirely removed from the densely populated portions of the city, that they will be located in the immediate vicinity of the rivers, that their number will be largely reduced, and that

the causes of complaint as to the manner of conducting this important business will be removed.

19. *Streets*.—There has been no change in the condition of the streets as regards their cleanliness. No improvement is anticipated during the existence of the present contract, as the contractor claims to have faithfully performed the duties imposed by its several provisions, without, however, securing to the public the results desired and expected. That the more thorough and frequent cleaning of the streets would be of uncalculable benefit to the public health there is no question. From a small appropriation made by the Legislature of 1867, for that purpose, this Board has during the present year cleaned some of the most filthy streets and gutters in the lower part of the city.

20. *Swine*.—The keeping of swine in the built up portions of the District has been generally discontinued, under the orders and by the enforcement of the Sanitary ordinances of this Board.

21. *Vacant Lots and Ponds*.—A large number of vacant lots have been filled, both in New York and Brooklyn, by order of the Board, with the most favorable results to the public health. The stagnant water upon the sunken lots and low lands in the vicinity of the cities is a constant cause of complaint, and the officers of the Board have spared no effort to remove this prolific source of disease. These sanitary improvements encourage the growth of the cities, extend their crowd population over a greater surface, and increase the wealth and resources of the Metropolitan District.

PERMITS.

Permits have been granted by the Board during the present year to parties engaged or desiring to engage in the various business pursuits which, if improperly or carelessly conducted, are or are liable to become detrimental to the public health. In all cases applications for permits are referred to sanitary officers, and the Board bases its action upon their reports of personal inspections, and their written statements as to the condition of the premises, the manner of conducting the business, and the character of the machinery and appliances used therein, and such other facts as are necessary to a proper understanding of the subject. As all permits are liable at any time to be revoked, this sanitary supervision secures the due attention to cleanliness and to the rules and regulations of the Board. To guard the cities of the District from the importation of disease from infected ports, all vessels arriving during the quarantine season from such ports are required, before arriving at any wharf, to present the permit of the Health Officer of the port to leave quarantine, and to obtain the permit of this Board to discharge their cargoes.

THE WATER SUPPLIES OF NEW YORK AND BROOKLYN.

The supplying of good and perfectly wholesome water, in ample quantities to great cities, is the very first requisite to public health; and perhaps no other cities in the world enjoy the blessing of better water supplies than New York and Brooklyn. As was shown by an elaborate statement on this subject, by Dr. Harris and Prof. Chandler, in the report of this Board last year, the purity of the waters which are supplied by the Croton and Ridgewood Aqueducts is equalled in but few cities in the world.

The first visitation of cholera to New York, in 1832, found the entire population dependent upon wells that derived their water from surface soakage, which at that time was in peril from the cholera infection itself; and, without knowing, as at present, how great and certain that kind of danger is, the most intelligent and public spirited citizens of New York were aroused to immediate and effectual efforts to secure the introduction of pure water from sources that would be comparatively secure against defilement. The construction of the Croton Aqueduct followed.

But in Brooklyn the supply of water from the great "filter-beds," or sands of the southern slope of Long Island dates only from 1858. It is unquestionably one of the purest and most trustworthy supplies of water that any city enjoys. The average of the semi-monthly analyses of the Ridgewood, from the Brooklyn hydrants and from the reservoir near the pump-well of the Conduit in the town of New Lots, by Prof. Chandler, the Chemist to this Board, shows that during the past summer and autumn the total quantity of organic matters in that water amounted to only 0.88 grains in a gallon, or 1.43 parts in 100,000 parts. The total of solid matters, all told, is shown to be only 5.34 parts in 100,000, or 3.11 grains in a gallon. The Croton water has, in like manner, been carefully analyzed twice each month, the samples being taken by Prof. Chandler, from the hydrants at the School of Mines, and from the Distributing Reservoir at the time of the analyses, as in the previous year. The results are summed up by him as follows:

Average of total solid matters in 100,000 parts (water from reservoir) was 7.67. Least quantity of solid matter in 100,000 parts was 7.01, or an average of 4.48 grains in a gallon, and the least solid residue 4.09 grains per gallon. The average of total solids in the water from hydrants differed from these results only the fraction of a grain. The average quantity of organic matters was 2.01 parts in 100,000 of water, or 1.17 grains per gallon, from the reservoir, and 1.10 grains per gallon from the College hydrants; while the least organic matter or impurity was found to be .099 grains per gallon, or 1.69 parts in 100,000, this specimen of greatest purity being obtained on the 19th of August. Prof. Chandler also reports that on the 2d and 17th days of September, and on the 1st of October, the Croton Reservoir water gave of organic matter but 1.70 parts in 100,000. For a full account of these valuable analyses made by Prof. Chandler, see Appendix.

In the statement here referred to, will also be found a tabular series of analyses of all the principal sources of supply and tributary, or mountain storage of the Croton. This is probably one of the most careful inquiries that has ever been made concerning the chemistry and purity of the very sources and storage ponds of a great water supply.

In the month of October, General Geo. S. Greene, one of the Croton Aqueduct Commissioners, and the Chief Engineer of that Department, invited such officers of this Board as could go, to accompany him on a tour for a sanitary inspection of the entire water-shed of the Croton Valley. Prof. Chandler, the Chemist, Dr. Harris the Registrar, and Mr. Worthen, the Sanitary Engineer, as officers of this Board, visited all the head waters of the Croton in the counties of Westchester, Putnam and Dutchess. Some of the practical results of that inspection and the analyses of the waters are embodied in the Appendix. The intelligent concern and vigilance with which the Croton Aqueduct Commissioners and Chief Engineer regard the Sanitary protection of the Croton river and reservoirs, is a subject of grateful appreciation by this Board and by all good citizens. In the tour of inspection just mentioned, the sources and means of guarding against defilement of the Croton water were particularly studied.

THE GAS NUISANCE.

The offensive and poisonous emanations from the gas manufactories claimed the attention of the Board and its Sanitary Inspectors very soon after the organization of the work, in the spring of 1866; from that time until the present it has continued to be a source of complaint from citizens, and of frequent inspections and reports by our medical officers. The proceedings that were had by this Board in April and May, 1866, resulted, after a full examination into the facts, in an earnest request to the gas corporations to employ the most approved method which chemistry has suggested for the purification of the gas, and the neutralization or destruction of the offensive gases that are removed by the process of manufacture. The New York company adopted the method of purifying the gas as it flows from the retort, by what is known as the sesqui-oxide of iron process; and the Manhattan Company tested various methods for burning the offensive gases after they have been separated by the lime process. The third gas corporation, the Metropolitan Company, at the foot of West Forty-Second street, made no effort to improve their purification, but continued to employ the common dry lime method, and it has been the cause of numerous complaints by residents in the Twentieth, Twenty-first and Twenty-second wards. Testimony was taken upon this subject in July, and on the 14th of that month the following order was made for the abatement of the evils complained of:

Order No. 425.

OFFICE OF THE METROPOLITAN BOARD OF HEALTH, }
No. 31 MOTT STREET, NEW YORK CITY. }

At a meeting of the Metropolitan Board of Health, held on the 14th day of July, 1868, at said office:

The premises hereinafter named, having been, and being in the opinion of said Board, and in fact, in a condition and in effect dangerous to life and health: and said Board having taken and filed among its records what it regards as being, and what is sufficient proof to authorize its declaration, that the same is a public nuisance, and dangerous to life and health: said Board does hereby enter the same on its records as a nuisance, and makes, in respect thereto, the following Order, to wit:

Ordered, That the business of manufacturing gas (conducted by the Metropolitan Gas Company) at foot of West Forty-second street, be discontinued, except it be conducted by a process of manufacture that will not allow any deleterious gases or odors detrimental to health to escape into external air.

And directs this order to be served as said Law requires, and that in case this order is not executed by the proper persons, the same be executed by the Board of Metropolitan Police; but that its execution be not commenced by the said Board of Metropolitan Police until the further order of this Board, of which further order no notice will be given to the parties interested. As witness the signature of

EMMONS CLARK,
Secretary of Metropolitan Board of Health.

This order not having been complied with, and the gas company having asked for a hearing of testimony, an order was issued for such hearing. And on the 10th day of August such examination was had before a referee appointed by the Board. An abstract of the chief points in the testimony given on that occasion by the Engineer of the Gas Works, and by Prof. C. F. Chandler, the Chemist to the Board, is given in the Appendix.

The Manhattan Company, at present the largest manufactory in the city, has adopted certain useful devices for the combustion of the offensive gases of the purifiers, and are at present conducting various experiments to test different improvements. But such is the vital importance of a pure atmosphere in our densely populated cities, that it is the duty of the manufacturers of the illuminating gas to adopt without further delay means by which all the poisonous and offensive emanations of their works shall be fully controlled.

In regard to the orders which the Board made during the summer for the abatement of the gas nuisance it should be remarked, that upon recommendation, sufficient time was allowed the manufactories to adopt the required improvements, and the Metropolitan Company was given until December 1st, 1868, for this purpose.

RETURNS OF CORONERS.

The returns of deaths made by Coroners to the Bureau of Vital Statistics, should be the most accurate and reliable of any received by that department. The law contemplates such accuracy, in conferring upon these officers power to make their investigations into the causes of death thorough and exhaustive. But it appears from the report of the Registrar, that the returns made by the Coroners are in general so inaccurate, that it is impossible to give them a scientific classification. The examination of the bodies of the deceased are too frequently either omitted altogether, or so imperfectly executed as to give no definite results. And this is a growing evil in the Metropolitan District, which demands the immediate atten-

tion of the Legislature. Important ends of justice and the interests of science require that the violent and accidental deaths referred to the Coroners, shall have the most prompt, thorough, impartial and intelligent investigation. This can be accomplished by giving this Board a more practical supervision of the duties of Coroners. It should have full power to require that all inquests be conducted in a manner to elicit every fact bearing upon the cause of death. Under the present system of popular election of Coroners, this is the most effectual remedy for the evil.

FOUNDINGS AND NURSERIES.

The public evil, and the social and moral wrongs of illegitimacy, great as they are, are fearfully enhanced by the degrading and inhuman means resorted to, in the endeavor to conceal the shame of parentage. Direct infanticide, and a cruel neglect of children born out of wedlock, no less criminal than infanticide, are growing sins of our times, which demand the most serious consideration of public authorities and of benevolent organizations. Though these crimes against infantile life are chiefly perpetrated in large cities, yet interior towns, and even the rural districts, send their helpless victims to the lying-in-houses of the abortionists and private asylums of *sage femmes* of the cities.

In New York, the illegitimate infants of the indigent classes receive the truly kind and enlightened care of the Commissioners of Public Charities and Correction. But there is a much larger class of homeless infants, whose parents resort to the most reprehensible means of concealing, and, if possible, of banishing the living evidences of their misfortune or crime. These parents and children become the unwilling and helpless victims of abortionists and keepers of private asylums and nurseries. How many of these nurseries exist in New York and Brooklyn, and how many cases of infanticide annually occur in these cities, is unknown to the Sanitary authorities. During the first year of the existence of this Board, its medical officers had made a catalogue of nearly fifty suspicious persons, and of as many places, and certificates of death made out by such persons, or at such houses, were refused until made the subject of investigation by a Coroner. But with all this precaution, these suspected persons have escaped conviction, and not one of these places where the double crime of abortion and infanticide are committed have been closed. This Board has not been able with its present powers to ferret out and control this class of evils, although its officers have exercised their utmost vigilance to discover the criminals, and their places of resort, and bring them to justice. In some of the most important cases brought to light, the courts have not enforced any penalties or restraints. Even in the noted case in West Seventeenth street, which occurred in the early part of the winter of 1868, no legal remedy was found, although the material facts were established by the affidavits of the parties who conducted the so-called nursery. The contracts for the care of the infants which had been the subjects of the

Coroner's inquests, were made with unknown parties to the following effect, viz.: "to be kept and fed until the babe was adopted out or died." This contract was generally fulfilled by the death of the infant. In this single nursery, managed by a woman whose advertisements were conspicuous in the daily papers, no less than seven infants were found to have died in the course of a few weeks, and the cause of death was, in the opinion of competent medical witnesses, *starvation*.

In view of these facts, this Board deems it a duty to represent to the Legislature, the vital importance of such legislation as will develop and control measures for preventing the evils and crimes to which reference has been made. It is a subject in which the people of the State at large, as well as of New York and Brooklyn, have a deep and abiding interest. While every possible encouragement should be given the Commissioners of Public Charities and Correction, in their praiseworthy efforts to place the foundlings which come under their charge, in the best possible condition for comfort, health and development, other charities may well be founded devoted to the rescue, protection and care of the unfortunate offspring of those who patronize private lying-in-asylums and private nurseries. Such institutions should be placed under the guardianship of enlightened and philanthropic Boards, and carefully guarded against every form of abuse of administration.

There should also be established a Lying-in-Asylum, for those unfortunate women who are about to give birth to illegitimate offspring. Such an institution might well form a branch of the public charities under the care of the Commissioners of Public Charities and Correction. It would not only do much to prevent infanticide, but would relieve much of the mental anguish of the victims of seduction, and save them from violent self-destruction and other crimes.

PUBLIC BATHS.

Personal cleanliness is universally and very justly regarded as essential to good health, and this is especially true of the poorer classes who are, of necessity, exposed to various sources of personal uncleanness. All trades render the atmosphere more or less impure and unwholesome by the necessary emanations, whether of dust or gases, and the body of the common laborer, in the open air, soon becomes enveloped in sweat and dirt, unless he has frequent ablutions. Important as personal cleanliness is to the health of the adult, it is of vital consequence to the young. The skin performs functions which cannot be interrupted without detriment to their proper growth and development. Personal cleanliness, also leads to domestic cleanliness. In proportion as the members of a family have fixed habits of personal cleanliness, in that proportion will they strive to make their home and its surroundings clean. It is not an unfrequent occurrence to find in crowded tenement houses, one or two families who struggle, in the midst of the all-pervading filth, to keep their apartments clean and

wholesome, and observation proves that these families are accustomed to bathing.

We can, therefore, but regard the establishment of public baths in New York and Brooklyn, as a great sanitary necessity. The laboring class of these cities have no adequate means of securing personal cleanliness, even if they were disposed to do so; but they have been so long accustomed to filth on their persons and in and around their homes, that they have lost much of the sense of shame or disgust at its presence. But experience proves that this indifference to filth of the person and home, is not inherent in any class. It grows out of a long process of training, and a want of proper facilities for securing baths. Wherever the experiment has been tried of establishing public baths, the result has been most encouraging. The poor have flocked to them in incredible numbers, and manifested an unmistakable desire for personal cleanliness. Public baths were erected in Boston, in 1866, and in 1867 twelve were in operation, at which 807,201 baths were given during the summer months. Similar baths have also been established in other cities, as in St. Louis, Mo., Cincinnati, O., Pittsburgh, Pa., Detroit, Mich., and with the same gratifying results.

Public baths in New York, to be of service to the laboring classes, must be located in the midst of the densest population, and in sufficient numbers to render them easy of access. There should be facilities for hot as well as cold baths, and also for salt water baths. They need not be expensive establishments, and may be conducted in a very economical manner. The total cost of the twelve bath-houses of Boston was \$21,457.70, and the average cost of each bath was, in 1867, .026 (two and six-tenths mills). This would serve as an approximate estimate of the cost of similar buildings in New York.

An act passed both Houses of the last Legislature authorizing the erection of public baths in New York, but it did not receive the sanction of the Governor. We would urge this subject upon the attention of the present Legislature, in the hope that a law, so drafted as to confer adequate power upon the proper authorities to secure the construction of public baths as a sanitary measure, will be enacted.

PUBLIC DRINKING FOUNTAINS AND URINALS.

At the last session of the Legislature an appropriation of \$3,500 was inserted in the tax levy to be expended under the direction of this Board in the erection of public drinking fountains and urinals. The Board has had under consideration various plans of meeting the public necessities with this small fund, and has finally determined to erect a public urinal at the junction of Eighth and Ninth streets, at Astor Place, the cost to be about \$2,400.

The value of public drinking fountains and urinals in a populous town like New York can scarcely be overestimated. The drinking fountain is not only a great convenience, but it is a great safeguard among the labor-

ing classes against the use of alcoholic beverages. Hundreds alake their thirst at these wayside fountains who would otherwise enter grog shops, and from temptation, or a supposed necessity, add liquors to the draught.

Public urinals have long been regarded as a necessity, but no steps have hitherto been taken to practically institute them. In foreign cities they are justly considered indispensable to the public comfort and health, and are provided both by municipal authorities and by individual enterprise. In this city and Brooklyn public urinals should be established as a sanitary measure. Their absence not only creates a vast amount of discomfort, and frequently intense suffering, but positive ill health results from that neglect of physical wants and necessities which their absence compels. The small fund appropriated for these useful purposes by the Legislature of last year will, we trust, be greatly increased this year, and ample facilities be given to supply both New York and Brooklyn with an adequate number of public drinking fountains and urinals.

DRAINAGE AND SEWERAGE.

The wide-spread prevalence of malarial fevers in the Metropolitan rural districts demands the most serious consideration. In many sections of the cities of New York and Brooklyn, and over large tracts of Richmond, Kings, Queens and Westchester counties, these fevers prevail during the summer and autumn months, and frequently with such severity as to necessitate the removal of large numbers of the inhabitants. Some of the most eligible districts for residence have thus been shunned or almost abandoned by the wealthier classes, and property of great intrinsic value has either depreciated or remained comparatively worthless. The pernicious effects of this class of diseases are not exhibited simply in the attacks of fever, but are traceable in various chronic affections, and in the deterioration of the general health which characterizes people long resident in these localities.

No fact is better established than that the thorough drainage of grounds which produce the malarial poison removes the conditions on which the generation of this poison depends. Districts most uninhabitable from the periodical appearance of malarial fevers have thus been rendered comparatively healthy, under circumstances apparently most unfavorable to general salubrity. And in general it may be stated that all marshy lands may be reclaimed, not only to the purposes of agriculture; but for habitation, if the drainage secures a dry soil.

But drainage for sanitary purposes, to be effectual, must be undertaken in a systematic manner. It is not sufficient to turn the water of one district upon another, as is too often the case, to relieve only partially the saturated soil. The work should be prosecuted on the most liberal and comprehensive plan, and the area involved, whether it embraces a township or even a county, should be brought under one system. The water-sheds and water-courses are to be carefully surveyed, the geological formations

examined, and the relation of the low lands and basins to the natural outlets studied, before the precise method of drainage can be determined. Systematic drainage, therefore, requires the co-operation of all the real-estate owners of districts of greater or less extent, according to the topography of the territory to be drained. But a combination of interests and efforts, which would be required to carry into execution so extended a system of public works, is practically impossible under any existing statute of the State of New York. It is held that "the law for the drainage of lands is simply for the benefit of the owner, and is not intended as a sanitary measure;" that "nuisances may be abated by force when they affect the entire community, and a responsible author may be indicted, but the penalty can only operate on corporations or individuals;" and that "actions at law may be maintained by persons who have been injured by public or private nuisances, but these actions rest upon grounds peculiar to each case, and they come far short of protecting individuals or communities from injurious effects of a polluted atmosphere and other producing causes of disease."

It is apparent, therefore, that drainage for the purposes above indicated requires further and special legislation. There should be a general Drainage Act under which districts or towns or counties can organize and prosecute these public works as a sanitary measure.

WHARVES AND PIERS.

The wharves and piers of New York and Brooklyn are in a condition highly detrimental to the public health of both cities. They are, with scarcely an exception, wooden structures, generally very much dilapidated, and are arranged without any regard to the tidal flow. The whole water front of the two cities where these structures exist is thickly studded with decayed or decaying wooden piles, which, like a net, serve to obstruct the outflow of sewers and of surface filth which reaches the water and to gather whatever river filth may float within their meshes. The result is that these rotten wharves and piers cover immense beds of putrescent filth, which the tides simply agitate but never remove. The emanations of gases from these vast collections during the hot summer months is frequently so stifling that laborers along shore are compelled to leave their work.

The effect of these intensely poisonous gases upon the public health is of the most positive character. During the summer months diarrhoeal diseases of a severe and fatal character prevail among those who are engaged much of the time upon the wharves and piers, and especially among seamen whose vessels remain long at our wharves. Several of the most fatal endemic fevers which have scourged this city began about the most filthy docks, and were the most malignant along the water-side.

A city can truly be regarded as in a poor sanitary condition which is partly invested, as is a large portion of both New York and Brooklyn, by a stratum of its own sewerage in the most putrescent condition. Even

if they had within themselves no other sources of disease, the wide diffusion of the foul emanations from their shores would be sufficient to give to each a high death-rate and a much higher sickness-rate. One of the great wants of New York and Brooklyn, both for their commercial prosperity and public health, is an entire and radical reconstruction of their wharves and piers. These structures should be of stone or other imperishable material, and should be so arranged as to allow free flow of the tides without the possibility of the retention or accumulation of filth of any kind. If the piers presented a smooth front of masonry to the tides, they would be flushed twice daily, and all sewerage and filth would be carried seaward beyond the possibility of its return.

WOODEN PAVEMENTS.

The attention of the Board has been called to this subject by memorials asking its endorsement, for sanitary reasons, of certain kinds of pavements, in which the wood has been seasoned, and then permeated with creosotish vapors, to prevent decay and to guard it from the attacks of insects. The Board has in all cases declared that its only duty or interest in the matter is of a sanitary character; that the limited experience in the use of wooden pavements does not authorize an official opinion on the subject; that time is necessary to settle this question, and that it can only recommend at present that the city should not engage in extensive paving with wood, until its economy and healthfulness are first ascertained by use. The report of the Sanitary Committee on this subject will be found in the Appendix.

MARKETS.

Section 6 of the Laws of 1867 made it the duty of the Board "to prepare and present to the next Legislature plans and recommendations for one or two new markets." After careful consideration the Board adopted a plan for one large market, to be located on the north side of the city, above Fourteenth street, and submitted to the Legislature, at its late session, the plans for the same for its consideration. The report of the Engineer, with an engraved plan of the market, will be found in the Appendix. No more important subject can claim the attention of the Legislature than that of the condition of the present market system. It is hoped that prompt attention will be given to this subject by the Legislature, and that through such action one or more markets will be authorized, which, when built, will be a credit to the city, and suitable to the growing wants of the people.

DRIVING AND SLAUGHTERING OF ANIMALS.

Since the organization of this Board no subjects have demanded more of its attention than the driving of cattle in the public streets, and the slaughtering of animals within the built-up portion of the cities of New York and Brooklyn. During the year 1866 and the early part of 1867, vigorous

measures were adopted for the regulation of cattle driving, and looking to the removal of slaughtering establishments to places to which no reasonable objection could be made. In this work the Board found encouragement in an almost unanimous public sentiment, and large abbatoirs were constructed at Communipaw and at Harlem. A large number of butchers abandoned their establishments in the lower part of the city of New York, and availed themselves of the accommodations afforded by these large establishments, while others removed to places of their own, at points deemed unobjectionable within the city limits. A few of the butchers appealed to the Courts against the orders of the Board, and succeeded, in the summer of 1867, in obtaining injunctions against the Board; and thereafter the driving of cattle in the streets, and the slaughtering of animals in the densest populated portions of the city were renewed. The suits, known as the Butchers' cases, were carried to the Court of Appeals by the law officers of the Board, and in the summer of this year a decision was obtained reversing the decisions of the lower Courts, and sustaining the legal authority of the Board. Acting upon the advice of counsel, the Board consented to an arrangement with the butchers, whereby they agreed, in writing, to remove their business of slaughtering above Fortieth street, before January 1st, 1869. It is believed that this agreement will be carried out in good faith, and that soon the offensive slaughter-pens of the lower wards of the city of New York will have disappeared forever. The driving of cattle is no longer tolerated, except in such streets and at such hours as are prescribed by the Code of Sanitary Ordinances.

During the present year the Butchers' Hide and Melting Association has completed an extensive abbatoir at the foot of Forty-fourth street, East River, upon the most approved plans, and with every device and convenience known in the business. The district about Kipp's Bay, upon the East River, between Fortieth and Forty-sixth streets, seems to be the best adapted to the business of slaughtering of any below One Hundredth street, as it lies behind high ledges of rocks, and the shore is washed by a swift tidal current. It is hoped that the business can be concentrated there; that the animals will be brought to the slaughter-houses in boats, and the offal either taken away in the same manner, or utilized on the premises. The officers of this Board will then be able to make a more thorough inspection of both the animals on foot and the meat upon the hooks, and thereby afford a reasonable assurance that no improper food from this quarter can reach the public.

While the slaughtering of animals within the city limits may possibly be tolerated, so far as the daily necessities of the people seem to require, it is a grave question whether hog-slaughtering, for the packing business, should be longer continued. Nearly a million of hogs are brought annually from the West, slaughtered within the limits of the city of New York, and packed for the markets of the world. Large pens are necessary, which are unavoidably filthy, the fat must be melted and the offal removed, all of

which tend to make the slaughtering of hogs one of the most serious nuisances with which the Board has to contend. Two hundred and fifty thousand people reside within a district where the atmosphere is from time to time tainted by the odors of these hog-pens and their various collaterals. In addition to this, several blocks are rendered uninhabitable by their close proximity to this and attendant nuisances, thereby crowding back upon the already densely populated districts those who would seek more room and a purer atmosphere.

INSPECTION OF SLAUGHTER HOUSES.

It having been reported to the Board that in the offal brought to the Rendering Dock from the slaughter-houses of the city, the viscera of cattle frequently gave evidences of severe disease, an inspection of all the slaughter-houses was directed to be made during the hours that slaughtering was in progress. The results of that inspection (see Appendix) proved that notwithstanding all the vigilance exercised, diseased cattle in limited numbers found their way to the shambles of even the most respectable butchers. This inspection proved conclusively, also, that the only safeguard against the introduction of diseased meat to our markets is an intelligent and vigilant inspection of the animals during the process of slaughtering. Such inspection would require the concentration of the business of slaughtering in abattoirs, where all the animals slaughtered would be brought under the immediate and constant observation of the inspectors. With the concentration of the slaughter-houses of New York, and the establishment of abattoirs now in progress, such an inspection will soon, we trust, be practicable.

FAT MELTING AND TALLOW RENDERING.

Prior to and during the year 1866 this business was conducted in a very offensive manner in open kettles, without any attempt, with one or two exceptions, to suppress or avoid the escape of the offensive gases and the poisonous odors evolved into the surrounding atmosphere. Soon after the organization of this Board, a thorough inspection of all the fat-melting and tallow-rendering establishments was instituted, and a study of the history, chemistry and methods employed during its operation was made, upon the completion of which a report was presented detailing all the facts, and suggesting the remedies to be applied in order that the business might be conducted in an inoffensive manner. One of the suggestions of that report was that the first requisite in conducting this and other kinds of business of the same class, such as bone-boiling, oil-refining, offal-boiling, &c., &c., should be that the first part of the process be conducted in "steam-tight kettles, tanks or boilers," in order to prevent the escape of offensive odors. From that time the Board, in granting permits for the business of fat-melting, has invariably required that it should be conducted in this manner, and the present condition fully proves the value of this improvement. All of the different processes yet adopted are more or less complicated, requiring

skill, experience and judgment in carrying them on without offence. Were the business confined to a few who possessed these requisites, and who felt the responsibility of conducting their business in an inoffensive manner, there is every reason to believe that it could be so conducted.

REMOVAL OF NIGHT SOIL.

The removal and disposal of the night soil of large cities are subjects that must always receive the attention of the sanitary authorities. The scavengers licensed by this Board have generally performed their duty satisfactorily, and the contractor has always provided boats of sufficient capacity and of proper construction for the removal of the night soil from the city. The wharf at the foot of Twenty-eighth street, North River, was formerly used by the scavengers, and answered the purpose for the west side of the city. During the winter of 1867-8 it was so injured by the ice as to be entirely useless, and has not yet been repaired by the Comptroller. The applications of the President of this Board in the early part of this year, and the resolution adopted August 25th, asking the Comptroller to designate and appropriate a pier upon the North River for the reception of night soil, have not been successful. The scavengers are therefore obliged to cart all their collections from the west side of the city to the foot of Livingston and East 17th streets. A large additional expense is necessarily incurred, while the constant rumbling of the heavy carts across the town at night has been a serious annoyance to the inhabitants of the central portion of the city, and a subject of frequent complaint to this Board. The Comptroller alone has power to remedy this evil.

In the city of Brooklyn a single dock, at North 6th street, remote from the populous Western District, affords the only accommodation for the whole city. While the contract calls for four docks for the reception of night soil, the citizens are compelled to submit to exorbitant charges and great inconvenience from this deliberate violation of his contract by the contractor.

REMOVAL OF STABLE MANURE.

A serious cause of offense in certain portions of the city of New York has been the practice, by various parties engaged in the purchase and sale of stable manure, of dumping the same upon vacant lots, where it was allowed to ferment and rot, with an occasional overturning to improve its value as a fertilizer. These accumulations, in certain cases, have reached the vast proportions of one hundred thousand cart-loads. As a consequence, whole neighborhoods have been obliged to live with closed doors and windows, or to constantly inhale the steaming odors of these manure heaps, while those seeking a place of residence avoided these localities, and the already narrow limits of the city were still further circumscribed to accommodate the manure trade. As these nuisances have generally been located upon the river banks, complaints were also frequent from those who passed

to and fro daily during the summer months upon the steamers of the North and East Rivers. The statement of the manure dealers, that it is difficult to remove their material, by water, at certain seasons of the year is doubtless correct; but the same may be said of night soil, which is regularly removed at all seasons of the year. The authority of this Board will be exercised to prevent the accumulation of stable manure during the winter, and for its prompt removal from the city. At present the ordinances of the Board prohibiting the dumping of manure on vacant lots are strictly enforced by the Metropolitan Police.

Serious and apparently well founded complaints having reached this Board, that the owners of large stables, in both the cities of New York and Brooklyn, were in the habit of causing the removal of their stable manure in the middle of the day, frequently obstructing the streets and sidewalks in populous neighborhoods, to the offense and injury of the district, an ordinance was passed, on the 20th of August, limiting the time of removal of this material to the hours between 6 P. M. and 8 A. M., except by special permit from the Sanitary Superintendent, or Assistant Sanitary Superintendent of this Board.

REMOVAL OF DEAD ANIMALS.

The removal and disposal of dead animals in an inoffensive manner, and without detriment to the public health, has received the attention of the Sanitary authorities. Recently a company has been formed for the purpose of rendering and utilizing this material, under the contract for its removal from the city of New York. Although not yet completely successful in accomplishing this object without offense, a great improvement has been made. It is believed that improved machinery and the use of disinfectants will accomplish all that is possible in this direction. Covered carts are now used in the built-up portions of the city for removing dead animals. The contractors, aided by the Police Telegraph, now promptly remove them to the offal dock, on Sunday as well as on the business days of the week.

STREET CLEANING.

A winter of uncommon severity, with large accumulations of snow and ice, rendered the streets of the city of New York, in the early months of the year, nearly impassable for vehicles and most disagreeable to pedestrians. The contractor for street cleaning is relieved by his contract from duty, except at the cross-walks, when the streets are covered with snow or ice, and the public was therefore obliged to quietly endure the consequent inconvenience and danger, there being no authority that could be invoked for relief. A report of the condition of affairs having reached Albany, a Committee of the Senate was appointed to investigate the condition of the streets, and arrived here at a moment when a personal inspection was almost impossible. The approaching spring, however, brought its usual copious rains, and the snow and ice gradually disappeared, revealing the accumula-

tions of the filth of months in which no street cleaning had been performed. At this time the contractor, with commendable energy, placed some six hundred carts, with the necessary laborers, upon the streets, and in some instances, where the ice melted slowly, caused it to be broken up and carted away.

Notwithstanding the bad condition of the streets in the latter part of the winter, they were cleaner upon the first of April than for many years previous at that season of the year. During the summer months the streets were regularly swept, and the ashes and garbage, when not thrown into the street, were regularly removed. Owing to the bad condition of the pavement in many of the streets and avenues, thorough cleaning is almost impossible. This is especially the case in the older portions of the city, where the cobble-stone pavement remains.

There are portions of several wards where the streets should be cleaned daily, as in the First, Fifth and Sixth wards, but the contractor is now only paid for sweeping them once a week. To remedy this evil during the summer months, the Sanitary Superintendent, availing himself of a small fund in the hands of the Comptroller for that purpose, employed a force of laborers, with carts, who daily visited the districts most requiring their presence, cleaning the gutters, and removing the offensive substances thrown into the streets by the residents. In some of those districts where formerly the death-rate has been fearfully large, and the Asiatic cholera has reaped a bountiful harvest, there has been a material improvement in the public health during the summer of the present year. The fund of twenty thousand dollars (\$20,000) placed at the disposal of the Board two years ago, has served a most beneficent purpose for two seasons, and one-third of the amount yet remains unexpended.

Another source of great annoyance to the citizens of both New York and Brooklyn during the winter of 1867-8, was the manner in which the various city railroad companies removed the accumulations of snow from their tracks. The snow removed from that part of the street within their rails was thrown upon the remaining narrow portion on either side, between the rail and the gutter. This additional accumulation of snow upon the narrow part of the street reserved for vehicles, rendered the avenues and wide streets almost impassable. Moreover the property owners along the line of these railroads were subjected to great additional expense to remove from the front of their premises the snow that should have been carried away by the railroad companies. Both private rights, as well as public health and convenience, require that some means should be adopted by the Legislature to prevent the city railroad companies from thus making dumping grounds of the premises of private citizens, and to oblige them to remove from the streets the snow taken from their tracks.

No subject of legislation for the city of New York should command more serious attention from the next Legislature than the condition of its streets and avenues.

as demonstrative as could be desired, yet they were sufficiently marked to prove the value and necessity of the work.

If we had no other ground of recommendation of this work than our own experience, this would be ample. The admirable results of disinfection, as a special sanitary measure, were so clearly demonstrated by this Board in its warfare against cholera in 1866, that they have been accepted by the Health Authorities of all the cities of the United States, and many of Europe, as conclusive. The fruits which the experience of this Board has borne are most gratifying. Their application in this country to putrescent organic matter has become almost universal, and their value is attested by a multitude of accurate observations.

But in initiating in this country a large application of the most powerful disinfectants to the filth of streets and gutters, cesspools, and all forms of putrescent surface material, which it had not the power to remove, the Board has not acted without precedent, the deductions of Sanitary chemistry, and a due regard to the experience of European towns where the measure has had an ample trial. In Dublin, Dr. Mapother, the Health officer, one of the highest authorities in Sanitary science, had the different kinds of street dust and filth chemically analyzed, and it was proved that about one-half the bulk was putrescible organic matter. This material simply required heat and moisture to convert it into poisonous gases, which are now known to be the efficient agents in producing the severest forms of diarrhoeal diseases in cities. The power of carbolic acid, copperas and other antiseptics to render this organic matter perfectly inert, so that it neither undergoes putrescence, nor acts as a poison, had been fully established. The Health Authorities of Dublin immediately followed the suggestion of their Health officer, and applied disinfectants to the filth of the streets and gutters, and with results which have rendered the work popular, and established it as a necessary Sanitary measure. Southampton, England, has been peculiarly exposed to the introduction of cholera infection from abroad. This was especially the case from the autumn of 1865 to the end of 1867. Among the measures adopted to preserve the city from the epidemic, was that of thorough street disinfection, as recommended by Dr. Wiblin, the Health officer, and Prof. Parkes, of the Army Medical School, and one of the ablest European writers on Sanitary questions. The authorities used 24 gallons per day of carbolic acid, except for a short period when the danger was greatest, during which they used 30 gallons per day. The city escaped the epidemic, and to this measure its immunity was chiefly ascribed. In 1866, the Health Authorities of Liverpool began the disinfection of streets and foul places with carbolic acid, on the approach of cholera, and prosecuted it with satisfactory results. Glasgow and a large number of smaller cities in Great Britain, followed the example, and enjoyed a remarkable immunity from cholera and diarrhoeal diseases. But Bristol, a town densely packed, and peculiarly exposed to cholera, as seen by its previous devastation by that scourge, its situation, and its high

death-rate from diarrhoeal diseases. affords the most striking example of the value of disinfectants, when thoroughly and persistently applied. The work began in July, 1866, and not only were the streets, gutters and privies regularly and thoroughly disinfected, but all alleys, filthy places and house drains, and even the entire sewerage of the town were subjected to the same treatment. The effect was immediate and decided. the epidemic ceased, and not only did the town continue exempt from cholera, but the general death-rate at that time and since has steadily declined, until Bristol gives as low an annual mortality from diarrhoeal diseases, as the healthiest towns in England. This example of Bristol is quoted by Sanitary writers of Europe as a good illustration of the value of scientifically directed disinfection.

Cleanliness is admitted by common consent to be a prerequisite to health, alike of the individual and the town. Hence it is the first and highest duty of health authorities to secure the prompt removal of every species of filth, whether found in the street, the gutter, the alley and public place, or in or around the tenements of the people. But when, by municipal or other regulations, they have not the power of removing filth, but must deal with it under the various circumstances in which it exists in populous cities, the duty is not less imperative of rendering it harmless, if possible, to those who are compelled to live in its midst during the season when heat and moisture develop its action and virulent properties. That we have in coal-tar, carbolic acid, copperas, etc., agents capable of perfectly restraining all putrescent changes of organic matter, in whatever form it may exist, is the belief of every eminent chemist and of every intelligent sanitary observer. The neglect of health authorities to employ these remedial agencies, now furnished so cheaply, in the destruction of sources of disease which they cannot remove, will soon be regarded by an enlightened public opinion as the most culpable negligence.

VACCINATION IN THE PUBLIC SCHOOLS.

On the 24th day of November, 1867, a resolution was adopted by the Board, as follows: "*Resolved*, That the Board of Education of the city of New York be respectfully requested to co-operate with this Board in securing a thorough system of vaccination in the Public Schools, and to facilitate the efforts of the Sanitary Superintendent for that purpose." The Board intended to employ its Inspectors in examining the marks left upon the children by vaccination, and in case they were found imperfect or absent, to require that they should be revaccinated by some physician to be designated by the parents or guardians. This useful work was commenced, but soon met with hostility from the Trustees of some of the schools, and through a misunderstanding with the Board of Education, was finally abandoned.

About the same time the Board was memorialized by Drs. Carnochan and Whitney, who remonstrated against the use of vaccine matter taken

from human beings, and asserted that it was productive of serious diseases, while the vaccine matter taken from cows was innocent, more reliable in its protective powers, and never productive of constitutional disease in those who used it. These objections, in the opinion of the Sanitary Committee, were not established by facts, and were subversive of all confidence in the ordinary means of guarding against the small-pox, and were likely to lead to the neglect of vaccination. Besides, they filled the minds of the people with idle fears, and made them the judges of a question which was purely medical. The Committee recommended that all the questions raised by the communication of Drs. Carnochan and Whitney should be referred to Dr. Loines, who is entitled, from his great experience, to speak authoritatively on the subject. Dr. Loines' report is exhaustive, and refutes the injurious allegations made against vaccine matter from human beings, and establishes its superiority over bovine vaccination.

RESCUE AND RESUSCITATION OF DROWNING PERSONS.

On several occasions, since the organization of this Board, the Registrar has called the attention of the Board to the frequent occurrence of death from accidental drowning. The subject was referred to the Sanitary Committee, who embodied the results of their investigation in a special report. (See Appendix.) In view of these facts, and in accordance with the recommendation of the Sanitary Committee, the Board, on the 23d of June, directed: 1st. The preparation of adequate apparatus for the rescue of drowning persons, to be placed at such points along the water front of the Metropolitan District as experience and observation had shown to be most liable to accident of this kind; and 2d. The instruction of a class of men, permanently on duty at such points, in the use of the apparatus and the practical application of approved methods for the resuscitation of the drowned. The apparatus consists of a grapnel or drag, a pike, a ladder and a float attached to a heaving line. The grapnel is made of a right triangular pyramid, of wrought iron, and weighs twelve ounces, the sides of its base being bisected with hooks about three inches in length, curved upward. At the apex of this skeleton pyramid is a movable swivel, to which a rope is attached. The pike is a flexible pole sixteen feet in length, one end of which is capped by three curved hooks ten inches long. The ladder is twelve feet long, of corresponding width, and has strong iron crane hooks by which to suspend it from the wharf. The other ends are terminated in iron points, by which it may be firmly embedded in the soil. The ladder is painted a green color, and marked in conspicuous characters, "FOR THE RESCUE OF DROWNING PERSONS." A wooden float, containing about twelve cubic inches, and weighing six ounces, together with twenty-five fathoms (150 feet) of cotton line, complete the apparatus. For use these different instruments are combined and adjusted as follows: The grapnel is secured to one end of the line, the float to the other end. The pikes and the ladder are hung to the wharf upon hooks. A lanyard allows the ladder

to be cast adrift and used as a raft in case of necessity. The person in danger of drowning may be reached either by the float, drag or pole, and in any event may be brought to the shore unhurt. All the metallic work of the apparatus is galvanized, to protect it from the corrosive action of the water. The methods for the resuscitation of drowning persons are those known as Marshall Hall's and Sylvester's. The special duty of instructing the water-side police in the practical application of these methods was intrusted to Dr. Benjamin Howard, whose report, made at the end of his term of service, follows the report of the Sanitary Committee (Appendix), accompanied by a list of Rescue Stations, and the rules for resuscitation. In addition to this special instruction, the Board issued a large edition of an illustrated pamphlet, giving minute directions for the application of these methods of resuscitation. The pamphlet was widely circulated, especially among those who most frequent the water sides. It also reached other seaboard cities, and many inland river and lake towns; and from the official correspondence of the Board it appears to have excited a wide-spread interest throughout the country in the effort to protect the public from this exceedingly prevalent cause of death.

QUARANTINE.

It is through this gateway from the sea that the greatest danger from contagious disease to the Metropolitan District arises. So frequently has the pestilence overleaped all quarantine barriers, that in the past, in the estimation of some, all efforts in that direction have been deemed useless. From yellow fever, one of the scourges which at times has stricken terror and caused a large mortality throughout the District, we have been during the past year protected, and it is the pleasure of this Board to report that it has not been called upon to take any sanitary action with reference to any disease or vessels coming from the Lower or Upper Bay, save to order the return of a few vessels to quarantine, which had proceeded without a permit from the Health Officer of the port.

CATTLE PLAGUE.

On the morning of August 8th, information reached the office of the Board that several car-loads of cattle with Spanish fever, or Texas cattle disease, had arrived at the herd yards in New Jersey, opposite the city of New York. The Registrar of the Board at once proceeded to examine those cattle. It was ascertained that more than fifty per cent of a large herd of cattle, shipped from Central Illinois only a week previously, had died before the arrival of this herd train at the Communipaw abattoir, and the disease appeared to be so pestilential that the flesh of the infected animals ought not to be used for food. The nature of this disease was of course at that time wholly unknown at the East, as well as at the West; but certain facts were ascertained at the first inspection, which Dr. Harris

justly regarded as sufficient to rank this with the pestilential diseases which require the attention of sanitary authorities.

During the day above mentioned (August 8th) the President and the Sanitary Superintendent of the Board ordered an inspection to be made of all cattle yards in New York, to ascertain if the disease was to be found within the limits of the city. On the subsequent day the President of the Communipaw Abattoir Company and the agent of the infected herd informed the medical officers of the Board that the herd, 141 in number, would be immediately sacrificed by slaughter for the fat rendering tanks at the abattoir, and invited any examination which they might desire to make. The rapidly increasing mortality from diarrhoeal disorders, and especially the suddenness of many of these diarrhoeal deaths in adults as well as in children, excited much anxiety at this period, and it seemed by no means improbable that the condition of the food supplied, no less than the high temperature, was playing a part in this excessive mortality. With these facts and the results of examinations before it, the Board directed the Sanitary Committee to organize a thorough investigation of the disease, with the aid of the officials of the Board. The direction of this investigation was confided to the Registrar, Dr. Harris, who had already given much attention to epigastric diseases, with whom was associated the Deputy Registrar, Prof. Chandler, the Chemist, and Dr. Morris, Sanitary Inspector. The Board is under great obligations to Dr. Harris for the promptness with which he undertook this laborious special service, and the thoroughness of the investigation which he instituted. To Dr. Stiles and Prof. Chandler great credit is due for their assistance in solving most difficult questions—the former with the microscope, the latter with the aid of chemistry. Dr. Morris was directed to observe the movements of cattle brought to market, and prevent the introduction of diseased meats, and to his vigilance we are indebted to the comparative immunity of the city from such meats.

On the 9th of August the President of the Board telegraphed to the Governors of the States of New York, New Jersey and Pennsylvania, requesting them to take the necessary measures for securing inspection of beef cattle arriving within their respective States, in transit to New York from the West. It was believed that the sale of diseased animals to the butchers in the city would thus be restrained by stopping, as far as possible, the transportation of diseased cattle. But the questions concerning the nature of this new disease among the cattle were destined to become so greatly the objects of inquiry by the State authorities, with special reference to the agricultural and pecuniary interests involved, that in taking these preliminary steps the Board hoped to be relieved of anxiety concerning the disease. In this they were not disappointed. Governor Fenton convened the three Commissioners, who had been appointed a year or two previously in anticipation of the introduction of rinderpest and other contagious epigastrics. On the 18th of August that Commission organized its plans and

immediately promulgated regulations to be observed on the lines of railways, etc. The suggestions and instructions which had been issued by the officers of this Board in regard to disinfection of herd yards and transport trains, etc., were adopted and recommended by the Commissioners, and they began their work by designating one of the Sanitary Inspectors of the Board as their Assistant Commissioner for the five counties comprised in the Metropolitan District.

Governor Geary, of Pennsylvania, acted promptly on the suggestion, and we have reason to believe that the movement of diseased cattle was arrested in that State. Governor Ward, of New Jersey, took decisive measures in regard to the inspection of herds, and the quarantine of diseased cattle, and co-operated daily with the Board. Thus the sanitary and police control of diseased cattle destined for the markets in the Metropolitan districts became very complete, and there is much reason to believe that the decrease of mortality and sickness from diarrhoeal diseases was not wholly independent of this kind of effort. The investigations into the nature and effects of the disease, and the laws which govern its propagation, were prosecuted by the medical officers above mentioned with the greatest zeal. No opportunity was lost to study all the phases of the disease, and every possible pathological condition. As far as possible this investigation was pursued with strict reference to the present requirements of sanitary science concerning the increase of knowledge in regard to pestilential diseases, both in relation to the food question and in relation to the still more important questions which are concerned in the origin and propagation of pestilential contagions. The extent and importance of these scientific researches may be judged by the results which appear in the special report on the cattle disease in the Appendix. That report undoubtedly constitutes one of the most valuable contributions that has ever been made by medical officers in any country to that class of special investigations, by which the great laws which govern pestilential diseases are being discovered.

By the enlightened action of the Cattle Plague Commissioners of the State of New York, and the energy of the State printers, the greater part of a valuable series of chromo-lithographic illustrations has been engraved and printed from the original sketches which the medical officers of this Board caused to be prepared in the course of their researches, to illustrate the medical history of this disease.

EXPENDITURES.

It will be seen, by reference to the Report of the Treasurer, that the total amount expended by the Board in the entire Metropolitan District, for the year ending November 15th, 1868, was one hundred and forty-two thousand, six hundred and forty-five dollars and ninety-two cents (\$142,645.92).

The amount paid out to contractors for executing the orders of the Board, during the year ending November 15th, 1868, was twenty-one thou-

and seven hundred and fifty-five dollars ninety-seven cents (\$21,755.97), of which amount eight thousand two hundred and eight dollars forty-three cents (\$8,208.48) was received from the persons for whom the work was done, and the balance, thirteen thousand five hundred and fifty-seven dollars fifty-four cents (\$13,547.54), was advanced by the Board. The several bills comprising this amount have been filed as a lien upon the property upon which the work was done, and will ultimately be repaid to the Board.

Respectfully submitted,

GEORGE B. LINCOLN,

President.

EMMONS CLARK,

Secretary.

TREASURER'S REPORT.

NEW YORK, November 30, 1868.

To the Metropolitan Board of Health :

I have the honor herewith to submit the enclosed detailed report of the receipts and disbursements of the Board, from the 15th day of November, 1867, to the 15th day of November, 1868.

It will be seen on reference to the report that the amount used by the Board for its ordinary expenses for the year ending November 15, 1868, is as follows :

General Expenses.

Salaries.....	\$41,961 49	
Contingent expenses	2,795 89	
Advertising.....	814 25	
Law expenses	810 00	
Stationery and printing.....	9,941 55	
Office furniture.....	833 75	
	<hr/>	\$56,156 98
Proportion charged to city and county of New York	\$46,988 45	
Proportion charged to Kings county.....	9,168 48	
	<hr/>	56,156 98

City and County of New York.

Commissioners	\$7,416 66	
Sanitary Inspectors.....	18,575 00	
Assistant Inspectors	8,533 33	
Registrar	8,500 00	
Clerks to Registrar	13,371 00	
Clerk in Disinfectant Department	1,250 00	
Clerk in Sanitary Police office.....	1,200 00	
Contingent expenses	7,656 54	
	<hr/>	\$56,502 58
Proportion of General Expenses.....	46,988 45	
	<hr/>	\$103,490 98

County of Kings

Commissioners	\$4,583 83	
Assistant Sanitary Superintendent.....	3,500 00	
Deputy Registrar.....	2,400 00	
Clerks to Assistant Sanitary Superintendent..	4,643 28	
Sanitary Inspectors.....	9,000 00	
Assistant Inspectors	1,460 00	
Contingent expenses	978 52	
	<u>\$26,565 18</u>	
Proportion of General Expenses.....	9,168 48	85,738 61
		<u>\$139,224 59</u>

BENJ. F. MANIERRE,
Treasurer.

R E C E I P T S.

Fund for New York County.

1868.		
Mar. 12. Cash from State Treasurer.....	\$50,000 00	
June 19. Cash from State Treasurer	20,000 00	
Aug. 20. Cash from State Treasurer.....	51,241 47	
Nov. 14. Interest on bank balances.....	625 08	
	<u>\$121,866 55</u>	

Fund for Kings County.

1868.		
Feb. 7. Cash from State Treasurer.....	\$8,373 74	
Nov. 14. Interest	596 82	8,970 56

Fund for Town of Yonkers.

1868.		
Feb. 25. Cash from State Treasurer.....		1,200 00

Fund for Town of Morrisania.

1868.		
July 8. Cash from State Treasurer.....	\$693 00	
24. Cash from State Treasurer.....	7 00	700 00

Fund for Town of West Farms.

1868.		
July 8. Cash from State Treasurer.....	\$698 00	
24. Cash from State Treasurer.....	7 00	700 00

Fund for Town of Newtown.

1868.		
Feb. 27.	Cash from State Treasurer.....	\$652 00

Fund for Richmond County.

1868.		
June 19.	Cash from State Treasurer.....	500 00

Fines and Penalties, New York County.

1868.			
July 1.	Cash from attorney, for violations of "Tene- ment House Act".....	\$97 64	
7.	Cash from attorney, for violations of "Tene- ment House Act".....	80 00	
27.	Cash from attorney, for violations of "Tene- ment House Act".....	196 00	
Sept. 8.	Cash from attorney, for violations of "Tene- ment House Act".....	139 75	
17.	Cash from attorney, for violations of "Tene- ment House Act".....	158 00	
22.	Cash from attorney, for violations of "Tene- ment House Act".....	270 00	
			941 39

Fines and Penalties, Kings County.

1868.		
Mar. 12.	Cash from Justice Buckley, for violations	55 00

Fund for Execution of Orders in New York County.

1868.	Am't rec'd from owner, for execution of—	June 17.	Order No. 1,613.....	\$6 75
April 14.	Order No. 11,308.....	18.	do No. 10,998.....	10 10
15.	do No. 11,136.....	18.	do No. 999.....	23 25
20.	do No. 11,108.....	18.	do No. 10,987.....	63 79
May 4.	do No. 11,426.....	18.	do No. 2,198.....	13 60
June 2.	do No. 1,707.....	19.	do No. 1,446.....	4 75
1.	do No. 38.....	19.	do No. 1,730.....	6 25
9.	do No. 663.....	20.	do No. 358.....	6 60
10.	do No. 1,194.....	20.	do No. 1,612.....	11 00
10.	do No. 8,290.....	20.	do No. 1,145.....	6 75
10.	do No. 7,462.....	20.	do No. 1,146.....	6 75
10.	do No. 124.....	20.	do No. 1,290.....	6 25
10.	do No. 434.....	20.	do No. 1,530.....	16 75
10.	do No. 264.....	20.	do No. 1,754.....	14 75
10.	do No. 3,739.....	20.	do No. 1,815.....	33 75
11.	do No. 925.....	20.	do No. 1,087.....	64 30
11.	do No. 1,151.....	22.	do No. 1,031.....	20 70
12.	do No. 1,697.....	22.	do No. 636.....	6 60
12.	do No. 904.....	22.	do No. 537.....	6 60
13.	do No. 1,427.....	22.	do No. 990.....	10 00
13.	do No. 1,487.....	22.	do No. 664.....	6 75
15.	do No. 1,412.....	22.	do No. 746.....	6 75
15.	do No. 109.....	22.	do No. 1,419.....	20 75
15.	do No. 737.....	22.	do No. 827.....	10 65
15.	do No. 854.....	22.	do No. 677.....	19 75
15.	do No. 900.....	22.	do No. 1,025.....	8 60
15.	do No. 1,624.....	24.	do No. 705.....	12 00
15.	do No. 890.....	22.	do No. 2,082.....	17 75
16.	do No. 1,806.....	23.	do No. 782.....	18 25
17.	do No. 834.....	23.	do No. 783.....	6 45
17.	do No. 829.....	23.	do No. 102.....	15 60
17.	do No. 643.....	23.	do No. 605.....	22 30
17.	do No. 1,512 and 1,513 ..	23.	do No. 1,774 and 1,775 ..	24 25
17.	do No. 1,514 and 1,515 ..	23.	do No. 1,160.....	6 00
17.	do No. 1,516 and 1,517 ..	23.	do No. 1,929.....	8 75
17.	do No. 852.....	23.	do No. 1,841.....	10 00
17.	do No. 673.....	24.	do No. 644.....	9 50
17.	do No. 2,075.....	25.	do No. 1,028 and 1,690 ..	8 20

June 25.	Order No. 545.....	838 65	Sept. 1.	Order No. 3,534.....	829 00
25.	do No. 1,550.....	94 40	1	do No. 4,012.....	9 00
25.	do No. 654.....	12 65	2.	do No. 16.....	46 75
25.	do No. 2,074.....	53 00	2.	do No. 8,405.....	29 00
25.	do No. 2,191.....	6 25	2.	do No. 2,552.....	20 80
29.	do No. 583.....	34 50	3.	do No. 3,113.....	51 00
29.	do No. 1,627.....	13 25	4.	do No. 3,780.....	11 50
July 1.	do No. 921.....	10 00	4.	do No. 3,662.....	11 00
1.	do No. 792.....	36 00	4.	do No. 3,789.....	0 00
1.	do No. 552 and 650.....	20 70	5.	do No. 4,281.....	2 72
3.	do No. 33.....	29 70	7.	do No. 3,658.....	11 10
6.	do No. 42.....	19 15	7.	do No. 4,654.....	12 40
6.	do No. 2,047.....	13 25	7.	do No. 4,097.....	2 57
6.	do No. 2,038.....	60 00	7.	do No. 3,984.....	15 90
6.	do No. 2,033.....	48 00	7.	do No. 4,237.....	5 75
6.	do No. 1,113.....	17 30	8.	do No. 2,757.....	13 00
8.	do No. 1928.....	11 84	8.	do No. 3,349 and 3,350 ..	80 00
8.	do No. 1,882 and 1,953 ..	30 25	9.	do No. 3,391.....	16 90
10.	do No. 1,643.....	23 21	9.	do No. 3,331.....	9 40
10.	do No. 1.....	57 50	9.	do No. 75.....	14 50
13.	do No. 2,823.....	33 25	9.	do No. 3,073.....	13 00
14.	do No. 999.....	29 00	9.	do No. 4,281.....	20 00
14.	do No. 1,831.....	1 50	9.	do No. 4,260.....	6 25
17.	do No. 1,043.....	28 75	9.	do No. 4,289.....	19 00
18.	do No. 2,459.....	13 01	10.	do No. 3,749.....	11 00
18.	do No. 263.....	1 50	11.	do No. 101.....	111 00
19.	do No. 2,504.....	10 00	11.	do No. 3,821.....	4 87
20.	do No. 999.....	2 50	12.	do No. 118.....	15 00
20.	do No. 2,829.....	5 95	14.	do No. 3,830.....	4 87
21.	do No. 2,176.....	5 55	14.	do No. 4,303.....	9 00
22.	do No. 2,157.....	20 00	16.	do No. 3,182.....	63 40
22.	do No. 9.....	42 50	17.	do No. 3,675 and 3,676 ..	30 25
23.	do No. 61.....	21 88	17.	do No. 97.....	131 59
24.	do No. 2,314.....	29 00	19.	do No. 3,240.....	52 44
24.	do No. 10,920.....	53 93	19.	do No. 4,251.....	28 5
25.	do No. 2,203.....	96 00	19.	do No. 4,099.....	101 60
25.	do No. 2,825 and 2,891 ..	24 25	19.	do No. 4,611.....	8 95
25.	do No. 2,829.....	28 90	21.	do No. 33.....	107 80
27.	do No. 3,391.....	21 40	21.	do No. 109.....	68 25
27.	do No. 2,389.....	26 75	21.	do No. 131.....	10 45
27.	do No. 2,151.....	5 40	21.	do No. 4,166.....	15 00
27.	do No. 2,546.....	70 11	21.	do No. 4,129.....	25 84
27.	do No. 3,287.....	20 00	22.	do No. 4,201.....	60 12
27.	do No. 3,281.....	15 13	23.	do No. 4,404.....	55 50
27.	do No. 3,282.....	15 13	22.	do No. 135.....	43 50
28.	do No. 2,790.....	30 25	25.	do No. 4,170.....	17 75
28.	do No. 2,221.....	3 50	25.	do No. 3,428.....	29 50
29.	do No. 1,750.....	3 81	25.	do No. 4,576.....	13 25
Aug. 3.	do No. 1,983.....	26 00	25.	do No. 4,118 and 4,372 ..	41 05
3.	do No. 3,215.....	24 25	Oct. 3.	do No. 708 and 797.....	13 40
4.	do No. 3,309.....	3 98	7.	do No. 28.....	26 00
4.	do No. 2,111.....	8 00	7.	do No. 3,402.....	20 00
5.	do No. 2,086.....	20 00	7.	do No. 3,621.....	99 73
5.	do No. 2,090.....	22 65	7.	do No. 4,229.....	25 25
5.	do No. 2,097.....	21 75	7.	do No. 4,578.....	24 25
5.	do No. 2,088.....	21 75	8.	do No. 114.....	12 50
5.	do No. 2,639 and 2,706 ..	20 00	13.	do No. 3,871.....	84 70
6.	do No. 1,981.....	12 30	13.	do No. 4,481.....	8 73
6.	do No. 2,081.....	27 75	19.	do No. 4,300.....	22 29
6.	do No. 2,578.....	19 58	19.	do No. 4,214.....	142 31
7.	do No. 2,954.....	20 00	20.	do No. 06.....	683 59
7.	do No. 2,069.....	12 40	21.	do No. 4,142.....	122 90
8.	do No. 3,100.....	5 25	21.	do No. 173.....	209 77
14.	do No. 3,128 and 3,129 ..	16 85	22.	do No. 4,001.....	4 00
14.	do No. 3,113.....	19 60	23.	do No. 4,487.....	5 00
15.	do No. 3,066.....	21 50	23.	do No. 156.....	121 25
18.	do No. 3,220 and 3,224 ..	35 85	24.	do No. 3,391.....	148 85
19.	do No. 3,075.....	3 00	24.	do No. 3,437.....	69 40
21.	do No. 2,553.....	28 41	24.	do No. 4,389.....	8 00
21.	do No. 2,581.....	24 25	24.	do No. 3,617.....	84 01
22.	do No. 3,160.....	35 45	27.	do No. 4,333.....	16 00
24.	do No. 2,811.....	29 00	29.	do No. 170.....	290 00
24.	do No. 5 and 95.....	0 50	Nov. 3.	do No. 4,525.....	94 25
25.	do No. 3,321.....	24 25	5.	do No. 116.....	74 02
26.	do No. 7,037.....	219 85	9.	do No. 3,877.....	59 30
27.	do No. 4,011.....	0 45	10.	do No. 4,597.....	4 75
27.	do No. 2,780.....	17 50	10.	do No. 187.....	45 80
27.	do No. 3,084.....	11 00	12.	do No. 72.....	5 75
29.	do No. 3,776.....	11 00			
29.	do No. 3,019.....	0 50			
29.	do No. 3,088.....	43 75	June 10	Cash from State Treasurer..	84,240 43
29.	do No. 3,837.....	15 35	Nov. 14.	Interest.....	30,000 00
29.	do No. 3,659.....	15 50			125 64
29.	do No. 21.....	17 25			
31.	do No. 3,529.....	19 50			
31.	do No. 3,523.....	21 55			

84,334 07

Fund for Execution of Orders in Kings county.

1868.

Nov. 14. Interest..... \$130 65

Fund for Special Expenses in New York, (see Chapter 837, Laws of 1866.

1868.

Jan. 4. Amount received from Clerk in charge of Disinfectant Department, for old materials..... \$300 00

Feb. 1. Amount received from Clerk in charge of Disinfectant Department, for old materials..... 273 86

July 24. Amount received from Property Clerk. for sale of old iron..... 127 30

Oct. 8. Am't rec'd from Clerk in charge of Disinfect'g Dep. 1 25

8. do do do 1,680 89

21. do do do 225 11

22. do do do 50 90

Nov. 14. Interest..... 649 03

3,308 33

Fund for cleaning streets, not included in street-cleaning contract, (see Chapter 876, Laws of 1866 ; also Tax Levy of 1867.)

1868.

Feb. 21. Interest..... \$184 51

Nov. 14. Interest..... 128 06

312 57

Fund for Drinking-Hydrants and Urinals, (see Tax Levy of 1868.)

1868.

July 24. Cash from Comptroller..... \$3,500 00

Nov. 14. Interest..... 32 08

3,532 08

Temporary Loan account.

1868.

Mar. 23. Amount borrowed from Nat. Shoe and Leather Bank, for expenses in town of Newtown.... \$40 39

May 30. Amount borrowed from 8th National Bank, for expenses in town of Rye..... 6 40

Amount borrowed from 8th National Bank, for expenses in town of Newtown..... 2 25

49 04

\$181,252 24*Recapitulation.*

Fund for New York county.....\$121,866 55

Fund for Kings county..... 8,970 56

Fund for town of Yonkers..... 1,200 00

Fund for town of Morrisania..... 700 00

Fund for town of West Farms..... 700 00

Fund for town of Newtown..... 652 00

Fund for Richmond county..... 500 00

Fines and penalties, New York county..... 941 39

Fines and penalties, Kings county..... 55 00

Fund for execution of orders in New York	\$38,334 07
Fund for execution of orders in Kings county.....	130 65
Fund for special expenses in New York	3,308 33
Fund for cleaning streets.....	312 57
Fund for drinking-hydrants and urinals.....	3,532 08
Temporary Loan account.....	49 04
	<hr/> \$181,252 24

DISBURSEMENTS.

GENERAL EXPENSES.

Salaries.

<i>Health Officer—</i>	
John Swinburne, from October 1, 1867, to October 1, 1868.....	\$300 00
<i>Treasurer—</i>	
Benjamin F. Manierre, from October 1, 1867, to October 1, 1868.....	300 00
<i>Secretary—</i>	
From November 1, 1867, to November 1, 1868.....	3,000 00
<i>Counsel—</i>	
From October 1, 1867, to October 1, 1868.....	5,000 00
<i>Attorney and Clerk—</i>	
From November 1, 1867, to November 1, 1868.....	3,000 00
<i>Sanitary Superintendent—</i>	
From November 1, 1867, to November 1, 1868.....	5,000 00
<i>Corresponding Secretary—</i>	
From November 1, 1867, to November 1, 1868.....	1,000 00
<i>Bookkeeper—</i>	
From November 1, 1867, to November 1, 1868.....	300 00
<i>Chief Clerk—</i>	
From November 1, 1867, to September 23, 1868, 10 23-30 months, at \$2,400 ..	2,154 33
From October 1 to November 1, 1868, at \$1,000.....	83 33
<i>Engineer—</i>	
From November 1, 1867, to November 1, 1868.....	4,000 00
For month of December, 1868.....	333 33
<i>Treasurer's Clerk—</i>	
From June 3 to November 1, 1868, at \$1,500	616 67
<i>Clerks to Secretary—</i>	
Pay roll for November, 1867... \$740 23	
do December, 1867....	783 34
do January, 1868....	783 33
do February, 1868....	783 33
do March, 1868.....	783 34
do April, 1868.....	783 33
do May, 1868.....	783 33
do June, 1868.....	783 34
do July, 1868.....	783 33
do August, 1868.....	783 33
do September, 1868.....	908 34
do October, 1868.....	908 33
	<hr/> 9,607 30

Clerks to Sanitary Superintendent—

Pay roll for November, 1867..	\$400 00
do December, 1867..	400 00
do January, 1868....	400 00
do February, 1868....	400 00
do March, 1868.....	400 00
do April, 1868.....	400 00
do May, 1868.....	400 00
do June, 1868.....	400 00
do July, 1868.....	400 00
do August, 1868.....	400 00
do September, 1868....	400 00
do October, 1868....	425 00
	<hr/> 4,825 00
<i>Janitor and Messengers—</i>	
Pay roll for November, 1867..	\$120 07
do December, 1867..	126 66
do January, 1868....	126 67
do February, 1868....	126 66
do March, 1868.....	126 67
do April, 1868.....	126 67
do May, 1868.....	126 66
do June, 1868.....	126 67
do July, 1868.....	126 67
do August, 1868.....	126 66
do September, 1868....	126 67
do October, 1868....	149 00
	<hr/> 1,542 33
	<hr/> \$41,001 40

Contingent Expenses.

1867		
Nov	29	Maria Lyons..... \$35 00
	30	Mary Connelly..... 15 00
Dec.	17	C. Golderman, jr..... 45 53
	19	John Bowne..... 0 82
	19	P. Nichols & Co..... 9 46
	31	Kevans & Co..... 250 07
	31	C. Golderman, jr..... 52 27
	31	Maria Lyons..... 35 00
	31	Mary Connelly..... 15 00
1-68.		
Jan	24	John Brady..... 12 40
	31	C. Golderman, jr..... 30 82
	31	Maria Lyons..... 35 00
	31	Mary Connelly..... 15 00
Feb	14	M. Dripps..... 30 00
	21	Maria Lyons..... 35 00
	20	Mary Connelly..... 15 00
Nov.	18	J. P. Loines..... 200 00
	24	Rockwood & Co..... 37 00
	31	C. Golderman, jr..... 53 00
	31	Maria Lyons..... 35 00
	31	Mary Connelly..... 15 00
April	6	Postage stamps..... 50 00
	7	D. B. Eaton..... 43 14
	8	John Brady..... 11 76
	25	C. Golderman, jr..... 49 18
	25	Maria Lyons..... 35 00
	23	Mary Connelly..... 15 00
	27	P. Nichols & Co..... 10 74
May	16	W. E. Worthen..... 200 00
	30	John Brady..... 15 54

May 30.	Maria Lyons.....	\$35 00	July 8.	Chas. Van Benthuyzen & Sons	\$32 00
30.	Mary Connelly.....	15 00	8.	D. Appleton & Co.....	60 00
June 25.	Maria Lyons.....	35 00	8.	M. B. Brown & Co.....	29 75
25.	Mary Connelly.....	15 00	8.	R. M. Whiting, jr.....	156 15
July 3.	Postage stamps.....	50 00	30.	M. B. Brown & Co.....	55 00
25.	Valentine & Butler.....	54 92	30.	W. C. Rogers & Co.....	451 55
25.	Joseph Cook & Co.....	12 00	Aug. 4.	R. M. Whiting, jr.....	110 50
25.	Maria Lyons.....	35 00	14.	Sandford, Cushing & Co.....	117 15
25.	Mary Connelly.....	15 00	14.	Thomas Holman.....	39 00
Aug. 4.	John Brady.....	14 24	Sept. 1.	D. Appleton & Co.....	43 63
25.	Maria Lyons.....	35 00	10.	M. B. Brown & Co.....	39 50
25.	Mary Connelly.....	15 00	10.	R. M. Whiting, jr.....	170 30
27.	C. Golderman, jr.....	90 00	Oct. 7.	John W. Amerman.....	51 75
27.	S. C. Hawley.....	500 00	7.	Francis & Loutrel.....	66 50
27.	D. B. Mellish.....	200 00	7.	Sandford, Cushing & Co.....	36 00
Sept. 4.	Charles F. Chandler.....	83 33	14.	John M. Burnet.....	154 00
26.	Maria Lyons.....	35 00	14.	R. M. Whiting, jr.....	137 00
26.	Mary Connelly.....	15 00	Nov. 2.	W. C. Rogers & Co.....	315 30
Oct. 7.	John Brady.....	50 00			
30.	Maria Lyons.....	35 00			
30.	Mary Connelly.....	15 00			
Nov. 11.	Postage stamps.....	50 00			
		\$2,795 80			

Advertising.

1867.		
Nov. 30.	New York Times.....	\$6 00
Dec. 19.	Commercial Adv. Association.	4 10
19.	W. C. Bryant & Co.....	4 35
31.	New York Times.....	6 00
1868.		
Jan. 24.	New York Tribune.....	11 50
24.	New York Herald.....	10 40
24.	Brooklyn Daily Union.....	3 00
Sept. 17.	New York Times.....	151 20
Oct. 7.	Brooklyn Daily Union.....	77 40
14.	New York Times.....	39 00
		\$314 25

Law Expenses.

1868.		
Jan. 21.	Warburton, Underhill & Bon-	
	ynge.....	500 00
June 20.	George Bliss, jr., expenses...	750 00
		\$1,250 00

Stationery and Printing.

1867.		
Nov. 30.	Sandford, Harroun & Co.....	\$2- 50
Dec. 15.	W. C. Rogers & Co.....	18 00
15.	W. C. Rogers & Co.....	430 00
15.	Sandford, Harroun & Co.....	27 00
15.	John W. Amerman.....	43 75
15.	D. Appleton & Co.....	4 17
15.	D. Appleton & Co.....	71 50
1868.		
Jan. 17.	W. C. Rogers & Co.....	15 00
21.	Bergen & Tripp.....	15 00
31.	Chas. Van Benthuyzen & Sons	229 62
Feb. 20.	Nyder, Black & Sturn.....	332 00
20.	W. C. Rogers & Co.....	436 20
29.	M. B. Brown & Co.....	42 75
Mar. 9.	Sandford, Harroun & Co.....	50 00
9.	John W. Amerman.....	130 20
12.	Sandford, Harroun & Co.....	13 00
15.	W. C. Rogers & Co.....	220 22
25.	C. H. Westcott & Co.....	1,460 00
25.	C. H. Westcott & Co.....	60 00
April 1.	W. C. Rogers & Co.....	644 65
4.	Sandford, Cushing & Co.....	47 00
5.	W. C. Rogers & Co.....	611 12
21.	W. C. Rogers & Co.....	4-2 50
May 13.	W. C. Rogers & Co.....	675 35
16.	R. M. Whiting, jr.....	246 25
16.	Sandford, Cushing & Co.....	50 65
21.	R. M. Whiting, jr.....	22 00
31.	Sandford, Cushing & Co.....	10 60
30.	W. C. Rogers & Co.....	114 00
30.	D. Appleton & Co.....	555 34
30.	M. B. Brown & Co.....	19 00
June 17.	Weed, Parsons & Co.....	63 75
17.	John W. Amerman.....	144 25
25.	Francis & Loutrel.....	27 30

July 8.	Chas. Van Benthuyzen & Sons	\$32 00
8.	D. Appleton & Co.....	60 00
8.	M. B. Brown & Co.....	29 75
8.	R. M. Whiting, jr.....	156 15
30.	M. B. Brown & Co.....	55 00
30.	W. C. Rogers & Co.....	451 55
Aug. 4.	R. M. Whiting, jr.....	110 50
14.	Sandford, Cushing & Co.....	117 15
14.	Thomas Holman.....	39 00
Sept. 1.	D. Appleton & Co.....	43 63
10.	M. B. Brown & Co.....	39 50
10.	R. M. Whiting, jr.....	170 30
Oct. 7.	John W. Amerman.....	51 75
7.	Francis & Loutrel.....	66 50
7.	Sandford, Cushing & Co.....	36 00
14.	John M. Burnet.....	154 00
14.	R. M. Whiting, jr.....	137 00
Nov. 2.	W. C. Rogers & Co.....	315 30
		\$6,941 55

Office Furniture.

1868.		
April 27.	Keyser & Co.....	\$33 75
Oct. 23.	Robert Paton.....	250 00
Nov. 2.	Robert Paton.....	50 00
		\$333 75

NEW YORK COUNTY.**Salaries.**

Commissioners—		
Jackson S. Schultz, from October 1, 1867, to Jan. 1, 1868, at \$2,500.....		\$625 00
Willard Parker, from Oct. 1, 1867, to April 1, 1868, at \$2,500.....		1,250 00
Stephen Smith, from April 1 to Oct. 1, 1868, at \$2,500.....		1,250 00
John O. Stone, from Oct. 1, 1867 to Oct. 1, 1868.....		2,500 00
Thomas C. Acton, from Oct. 1, 1867, to Oct. 1, 1868.....		500 00
Joseph S. Bosworth, from Oct. 1, 1867, to Oct. 1, 1868.....		500 00
Ben. F. Manierre, from Oct. 1, 1867, to Oct. 1, 1868.....		500 00
Matthew T. Brennan, from March 1 to Oct. 1, 1868.....		291 66
		\$7,416 66

Sanitary Inspectors—

Pay roll for November, 1867.....	\$1,550 00
do December, 1867.....	1,550 00
do January, 1868.....	1,550 00
do February, 1868.....	1,550 00
do March, 1868.....	1,550 00
do April, 1868.....	1,550 00
do May, 1868.....	1,550 00
do June, 1868.....	1,550 00
do July, 1868.....	1,550 00
do August, 1868.....	1,550 00
do September, 1868.....	1,550 00
do October, 1868.....	1,550 00
	\$18,575 00

Assistant Inspectors—

Pay roll for November, 1867.....	\$100 00
do December, 1867.....	33 33
do June, 1868.....	100 00
do July, 1868.....	1,100 00
do August, 1868.....	1,100 00
do September, 1868.....	1,100 00
	\$3,633 33

Registrar of Vital Statistics—

From Nov. 1, 1867, to Nov. 1, 1868...	\$3,500 00
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Clerks to Registrar of Vital Statistics—

Pay roll for November, 1867.....	\$1,006 34
do December, 1867.....	1,006 34
do January, 1868.....	1,063 34
do February, 1868.....	1,118 33

Pay roll for March, 1868.....	\$1,103 34
do April, 1868.....	1,103 32
do May, 1868.....	1,103 32
do June, 1868.....	1,103 34
do July, 1868.....	1,103 34
do August, 1868.....	1,103 32
do September, 1868.....	1,103 34
do October, 1868.....	1,353 34
	<u>\$13,371 00</u>

Clark in charge of Disinfectant Department—

From January 1 to November 1, 1867,	
10 months, at \$1,500.....	\$1,250 00

Clark in Sanitary Police Office—

From Nov. 1, 1867, to Nov. 1, 1868....	\$1,200 00
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Contingent Expenses.

1867.		
Nov.	30. John D. Peck.....	\$125 00
	30 Pay roll—Disinfectant Dep't....	275 00
Dec.	19 New York Gas Light Co.....	1- 55
	31 John D. Peck.....	125 00
	31 Pay roll—Disinfectant Dep't....	275 00
1868.		
Jan.	31. Drew & Crane.....	2- 85
	31 Titton & Putney.....	20 00
	31 Pay roll—Disinfectant Dep't....	275 00
Feb.	8 Dennis O'Connor.....	14 00
	13 Mattison & McCoy.....	102 50
	14 W. Feldhausen.....	15 40
	25 New York Gas Light Co.....	29 13
	25 John Bowne.....	10 30
	29 Pay roll—Disinfectant Dep't....	275 00
March	4 Titton & Putney.....	20 00
	4 Joshua Dyson.....	23 11
	4 James A. Christie.....	2 60
	27 John D. Peck.....	62 50
	31 Pay roll—Disinfectant Dep't....	150 00
April	1 Titton & Putney.....	20 00
	1 James A. Christie.....	51 55
	8 Joshua Dyson.....	23 35
	8 James Hubbard.....	51 50
	25 Postage stamps.....	66 24
	27 James A. Christie.....	7 00
	28 Pay roll—Disinfectant Dep't....	150 00
May	10 W. E. Worthen.....	150 00
	21 John Bowne.....	23 34
	30 Pay roll—Disinfectant Dep't....	150 00
	30 New York Gas Light Co.....	24 00
	30 Titton & Putney.....	40 00
	30 Joshua Dyson.....	84 64
	30 Owen Fallon.....	6 37
	30 John Bailey.....	1 50
	30 James A. Christie.....	45 92
June	17. Adolph Vreoux.....	39 85
	19. James A. Christie.....	15 32
	24 Geo. A. Jeremiah.....	260 00
	25 John Bowne.....	13 15
	25 Pay roll—Disinfectant Dep't....	150 00
July	8. John Bowne.....	27 95
	8 James A. Christie.....	43 94
	8 Joshua Dyson.....	44 44
	8 Titton & Putney.....	20 00
	23 R. M. Lush.....	81 00
	25 Pay roll—Disinfectant Dep't....	150 00
	27 Pay roll—Disinfecting Streets.....	229 61
	30 Page, Kulter & Co.....	226 40
	30 A. B. Yetter.....	45 00
Aug.	1 James A. Christie.....	77 00
	4. Drew & Crane.....	164 00
	4 Joshua Dyson.....	34 77
	4 Page, Kidder & Co.....	323 20
	4 Horace V. Sigler.....	22 50
	7 Alfred R. Ward.....	40 00
	8 James A. Christie.....	70 00
	8 Geo. A. Jeremiah.....	130 00
	8 W. E. Worthen.....	110 00
	14 John H. Whitson.....	450 00
	14 Page, Kulter & Co.....	60 45
	14 Anthony Miller.....	89 94
	14 James A. Christie.....	72 53
	14 Owen Fallon.....	21 75
	14 Snelks & Co.....	9 50
	14 James P. Hydo.....	9 30

Aug.	14. Woodward & Pearson.....	\$71 50
	15 James A. Christie.....	15 00
	20 E. Harris.....	3 50
	20 New York Gas Light Co.....	18 20
	20 Smith & Crane.....	24 60
	25 Pay roll—Disinfectant Dep't....	150 00
	25 Pay roll—Disinfecting Streets.....	60 00
	27 Chas. Currier.....	15 00
	27 John Bowne.....	11 25
Sept.	1 A. B. Yetter.....	120 00
	4 Jacob Barker.....	515 03
	10 Joshua Dyson.....	40 83
	10 James A. Christie.....	41 19
	17 F. Crummet.....	68 00
	17 E. Van Rens.....	20 00
	21 James W. Kenna.....	45 00
	21 Moreau Morris.....	127 50
	21 James A. Christie.....	27 00
	21 Joshua Dyson.....	4 00
	20 F. J. Randall.....	100 00
	20 Pay roll—Disinfectant Dep't....	150 00
Oct.	7 Joshua Dyson.....	39 12
	14 J. Coughlin.....	7 10
	14 Owen Fallon.....	1- 00
	20 Thomas Holman.....	42 00
	21 F. Wilse.....	7 50
	24 Pay roll—Disinfectant Dep't....	210 00

\$7,055 54

KINGS COUNTY.

Salaries.

<i>Commissioners—</i>	
James Crane, from Nov. 1, 1867, to	
Oct. 1, 1868.....	\$2,500 00
Geo. B. Lincoln, from Jan. 1, to Nov.	
1, 1868.....	2,083 33
	<u>\$1,583 33</u>
<i>Assistant Sanitary Superintendent—</i>	
From Nov. 1, 1867, to Nov. 1, 1868....	\$3,500 00
<i>Deputy Registrar of Vital Statistics—</i>	
From Nov. 1, 1867, to Nov. 1, 1868....	\$2,400 00
<i>Clerks to Asst. Sanitary Superintendent—</i>	
Pay roll for November, 1867.....	\$250 00
do December, 1867.....	350 00
do January, 1868.....	350 00
do February, 1868.....	418 66
do March, 1868.....	300 00
do April, 1868.....	454 29
do May, 1868.....	350 00
do June, 1868.....	350 00
do July 1868.....	350 00
do August, 1868.....	473 33
do September, 1868.....	450 00
do October, 1868.....	450 00
	<u>\$4,043 29</u>
<i>Sanitary Inspectors—</i>	
F. H. Colton, from Nov. 1, 1867, to	
Nov. 1, 1868.....	\$1,800 00
James R. Bird, from Nov. 1, 1867, to	
Nov. 1, 1868.....	1,800 00
S. N. Fisk, from Nov. 1, 1867, to Nov.	
1, 1868.....	1,800 00
S. J. Holley, from Nov. 1, 1867, to	
Nov. 1, 1868.....	1,800 00
Wm. H. Trayer, from Nov. 1, 1867, to	
Nov. 1, 1868.....	1,800 00
	<u>\$6,000 00</u>
<i>Assistant Inspectors—</i>	
Pay roll for November, 1867.....	\$200 00
do December, 1867.....	60 00
do June, 1868.....	300 00
do July, 1868.....	300 00
do August, 1868.....	300 00
do September, 1868.....	300 00
	<u>\$1,460 00</u>

Contingent Expenses.

1867.			Mar.	9. John Shreiner.....	\$214 00
Nov.	30. J. E. Smith & Son.....	\$37 50		9. James Ingram & Son.....	20 57
Dec.	17. Horace Straug.....	5 00		16. John Barnes.....	137 92
	28. J. S. Stryker.....	2 92	April	17. D. J. Mead.....	117 96
1868.			May	25. James A. Christie.....	5 50
Jan.	24. Horace Straug.....	9 00	May	21. Keyser & Co.....	931 25
Feb.	4. F. Conkling.....	5 00	July	27. R. C. Brown.....	701 27
	20. Daniel F. Lewis.....	147 00	Aug.	4. John Barnes.....	115 51
	20. R. M. Whiting, jr.....	22 00		Am't paid contractor for execution of—	
Mar.	31. Horace Straug.....	9 00	June	4. Order No. 38.....	273 00
April	6. J. E. Smith & Son.....	51 00	July	6. do No. 11,156.....	11 25
	9. Geo. C. Wood.....	6 00		6. do No. 11,308.....	14 50
	20. J. S. Stryker.....	2 65		6. do No. 11,108.....	4 50
July	8. Horace Straug.....	12 00		6. do No. 11,119.....	1 50
	25. Daniel Sullivan.....	7 00		6. do No. 11,426.....	1 50
	25. Richard Sheridan.....	15 00		6. do No. 10,989.....	10 10
	25. F. Wardell.....	5 00		6. do No. 834.....	5 25
	25. Chas. W. Watson.....	2 00		6. do No. 323.....	24 50
	25. John B. Holland.....	15 00		6. do No. 829.....	60 00
	30. John Rogers.....	12 00		6. do No. 443.....	22 30
	30. Richard Sheridan.....	9 00		6. do No. 359.....	5 00
	30. John B. Holland.....	11 00		6. do No. 1,412.....	24 25
Aug.	4. Richard Sheridan.....	11 00		6. do No. 1,612.....	11 00
	4. John B. Holland.....	11 00		6. do No. 7-2.....	15 35
	4. F. Wardell.....	22 00		6. do No. 1,011.....	20 70
	4. Edward Bragaw.....	10 00		6. do No. 114.....	18 35
	14. John P. Holland.....	12 00		6. do No. 7-3.....	6 45
	14. Richard Sheridan.....	10 00		6. do No. 531.....	8 50
	14. F. Wardell.....	12 00		6. do No. 537.....	8 50
	20. Richard Sheridan.....	12 00		6. do No. 737.....	13 40
	20. Edward Bragaw.....	12 00		6. do No. 120.....	10 00
	20. John B. Holland.....	12 00		6. do No. 621.....	10 00
	20. F. Wardell.....	12 00		6. do No. 1,686 and 1,689.....	8 20
Sept.	10. Thomas McFadden.....	3 00		6. do No. 1,627.....	12 25
	10. Henry Carson.....	3 00		6. do No. 1,707.....	65 90
	10. Edward Bragaw.....	34 00		6. do No. 1,145.....	5 75
	10. F. Wardell.....	23 00		6. do No. 1,146.....	5 75
	10. John H. Holland.....	24 00		6. do No. 995.....	9 00
	10. Richard Sheridan.....	20 00		6. do No. 1,447.....	24 25
	10. E. R. Squibb.....	47 50		6. do No. 664.....	5 75
	17. F. Wardell.....	22 00		6. do No. 820.....	10 40
	17. John B. Holland.....	22 00		6. do No. 664.....	7 5
	17. Henry Carson.....	8 00		6. do No. 663.....	7 5
	17. Richard Sheridan.....	16 00		6. do No. 1,487.....	1 50
	17. Edward Bragaw.....	22 00		6. do No. 1,164.....	7 50
Oct.	7. Richard Sheridan.....	20 00		6. do No. 545.....	36 65
	7. John B. Holland.....	24 00		6. do No. 1,419.....	32 75
	7. Edward Bragaw.....	18 00		6. do No. 1,607.....	16 75
	7. J. S. Stryker.....	8 50		6. do No. 929.....	23 25
	14. Richard Sheridan.....	14 00		6. do No. 827.....	19 25
	14. Chas. W. Watson.....	1 00		6. do No. 102.....	15 50
	14. F. Wardell.....	12 00		6. do No. 904.....	20 00
	14. John B. Holland.....	18 00		6. do No. 1,290.....	6 25
	14. Henry R. Stiles.....	7 36		6. do No. 1,530.....	16 75
	14. J. M. Hopper.....	15 00		6. do No. 33.....	29 70
	14. Wm. H. Thayer.....	15 50		6. do No. 1,151.....	21 50
	24. J. E. Smith & Son.....	43 00		6. do No. 905.....	22 30
				6. do No. 1,612 and 1,513.....	30 70
				6. do No. 1,514 and 1,515.....	30 70
				6. do No. 1,516 and 1,517.....	30 70
				6. do No. 1,446.....	4 75
				6. do No. 900.....	23 30
				6. do No. 852.....	12 40
				6. do No. 1,774 and 1,775.....	24 25
				6. do No. 1,754.....	14 75
				6. do No. 1,806.....	4 75
				6. do No. 677.....	19 78
				6. do No. 678.....	19 78
				6. do No. 1,992 and 1,993.....	30 25
				6. do No. 1,635.....	8 00
				6. do No. 1,850.....	24 80
				6. do No. 1,815.....	33 75
				6. do No. 644.....	9 50
				6. do No. 1,087.....	64 30
				6. do No. 1,160.....	8 00
				6. do No. 1,087.....	63 75
				6. do No. 654.....	12 25
				6. do No. 1,929.....	8 75
				6. do No. 705.....	12 00
				6. do No. 2,075.....	16 25
				6. do No. 1,813.....	5 75
				6. do No. 1,841.....	10 00
				6. do No. 2,108.....	13 50
				6. do No. 2,074.....	53 00
				6. do No. 2,082.....	17 75
				6. do No. 1,924.....	13 25
				6. do No. 2,191.....	6 25

\$075 52

*Fund for Execution of Orders
in New York County.*

1867.		
Nov.	30. James Ingram & Son.....	\$411 45
Dec.	4. D. J. Mead.....	242 34
	21. James Ingram & Son.....	407 81
1868.		
Jan.	24. Geo. R. Hoyt.....	10 00
Feb.	20. James Ingram & Son.....	1,273 53
	20. R. C. Brown.....	1,139 46
	20. Keyser & Co.....	970 82
Mar.	7. F. Cramer.....	95 10
	9. F. Breivogd.....	1,401 84
	9. John May.....	348 32
	9. John Moser.....	630 71
	9. S. Lutz.....	206 15
	9. F. Dolly.....	156 05
	9. Daniel Schmidt.....	26 50
	9. John Zetter.....	180 83
	9. Geo. Damsen.....	85 85
	9. C. Dick.....	59 50
	9. John Denner.....	735 54
	9. Wm. Vollmer.....	72 25

July			Aug.			Sept.		
22	Order No.	918	22	Order No.	2,380	9	Order No.	746
22	do	No 11,399	22	do	No 2,450	9	do	No 3,220 and 3,294
22	do	No 11,459	22	do	No 2,478	9	do	No 3,120
22	do	No 1,235	22	do	No 2,483	9	do	No 3,211
22	do	No 700	22	do	No 2,300	9	do	No 3,193 and 3,190
22	do	No 7-1	22	do	No 1,953	9	do	No 3,113
22	do	No 796 and 797	22	do	No 2,405	9	do	No 3,490
22	do	No 558 and 559	22	do	No 2,157	9	do	No 3,413
22	do	No 1,510	22	do	No 2,614	9	do	No 3,405
22	do	No 981	22	do	No 2,695	9	do	No 3,675 and 3,676
22	do	No 817	22	do	No 2,690	9	do	No 3,529
22	do	No 109	22	do	No 2,697	9	do	No 4,011
22	do	No 2,239	22	do	No 30	9	do	No 85 and 86
22	do	No 1,523	22	do	No 2,098	9	do	No 3,075
22	do	No 41	22	do	No 2,090 and 2,700	9	do	No 16
22	do	No 1,131	22	do	No 1,131	9	do	No 3,553
22	do	No 11,110	22	do	No 583	9	do	No 3,700
22	do	No 907, 908, 910 & 970	22	do	No 300	9	do	No 3,523
22	do	No 734	22	do	No 2,000	9	do	No 3,684
22	do	No 1,659	22	do	No 2,185	9	do	No 3,81
22	do	No 920	22	do	No 2,700	9	do	No 2,1
22	do	No 1,450	22	do	No 2,825 and 2,828	9	do	No 3,534
22	do	No 1,157	22	do	No 2,823	9	do	No 3,760
22	do	No 11,275	22	do	No 2,470	9	do	No 3,523
22	do	No 731	22	do	No 2,927	9	do	No 3,684
22	do	No 1,390	22	do	No 2,225	9	do	No 3,81
22	do	No 1,242	22	do	No 2,820	9	do	No 2,1
22	do	No 518	22	do	No 2,820	9	do	No 3,534
22	do	No 179	22	do	No 2,340	9	do	No 3,760
22	do	No 509	22	do	No 2,320	9	do	No 3,523
22	do	No 650	22	do	No 10,970	9	do	No 3,684
22	do	No 675	22	do	No 65	9	do	No 3,81
22	do	No 1,534	22	do	No 8	9	do	No 2,1
22	do	No 980	22	do	No 2,525	9	do	No 3,534
22	do	No 554	22	do	No 2,704	9	do	No 3,760
22	do	No 1,434	22	do	No 178	9	do	No 3,523
22	do	No 735	22	do	No 1,222	9	do	No 3,684
22	do	No 911	22	do	No 61	9	do	No 3,81
22	do	No 92	22	do	No 1,750	9	do	No 2,1
22	do	No 1,060	22	do	No 2,411	9	do	No 3,534
22	do	No 830	22	do	No 1,981	9	do	No 3,760
22	do	No 699	22	do	No 2,088	9	do	No 3,523
22	do	No 741	22	do	No 2,089, 2,160 & 2,161	9	do	No 3,684
22	do	No 1,179	22	do	No 2,981	9	do	No 3,81
22	do	No 42	22	do	No 2,154	9	do	No 2,1
22	do	No 45	22	do	No 2,578	9	do	No 3,534
22	do	No 956	22	do	No 3,215	9	do	No 3,760
22	do	No 902	22	do	No 2,909	9	do	No 3,523
22	do	No 1,005	22	do	No 3,257	9	do	No 3,684
22	do	No 1,383	22	do	No 3,281	9	do	No 3,81
22	do	No 912 and 913	22	do	No 2,998	9	do	No 2,1
22	do	No 570	22	do	No 3,148 and 3,725	9	do	No 3,534
22	do	No 876	22	do	No 3,160	9	do	No 3,760
22	do	No 1,700	22	do	No 3,309	9	do	No 3,523
22	do	No 740	22	do	No 746	9	do	No 3,684
22	do	No 79	22	do	No 3,220 and 3,294	9	do	No 3,81
22	do	No 849	22	do	No 3,120	9	do	No 2,1
22	do	No 702	22	do	No 3,211	9	do	No 3,534
22	do	No 1,904	22	do	No 3,193 and 3,190	9	do	No 3,760
22	do	No 1,943	22	do	No 3,113	9	do	No 3,523
22	do	No 2,047	22	do	No 3,490	9	do	No 3,684
22	do	No 21	22	do	No 3,413	9	do	No 3,81
22	do	No 22	22	do	No 3,405	9	do	No 2,1
22	do	No 25	22	do	No 3,675 and 3,676	9	do	No 3,534
22	do	No 56	22	do	No 3,529	9	do	No 3,760
22	do	No 81	22	do	No 4,011	9	do	No 3,523
22	do	No 135	22	do	No 85 and 86	9	do	No 3,684
22	do	No 1,496	22	do	No 3,075	9	do	No 3,81
22	do	No 1,885	22	do	No 16	9	do	No 2,1
22	do	No 11,177	22	do	No 3,553	9	do	No 3,534
22	do	No 48	22	do	No 2,757	9	do	No 3,760
22	do	No 2,039	22	do	No 2,853	9	do	No 3,523
22	do	No 1,842	22	do	No 101	9	do	No 3,684
22	do	No 1,901	22	do	No 3,534	9	do	No 3,81
22	do	No 2,169	22	do	No 3,700	9	do	No 2,1
22	do	No 2,023	22	do	No 3,523	9	do	No 3,534
22	do	No 1,493	22	do	No 3,684	9	do	No 3,760
22	do	No 2,033	22	do	No 3,81	9	do	No 3,523
22	do	No 975	22	do	No 2,867	9	do	No 3,684
22	do	No 2,179	22	do	No 3,321	9	do	No 3,81
22	do	No 762	22	do	No 3,652	9	do	No 2,1
22	do	No 1,113	22	do	No 21	9	do	No 3,534
22	do	No 2,203	22	do	No 75	9	do	No 3,760
22	do	No 2,314	22	do	No 3,062	9	do	No 3,523
22	do	No 2,440 and 2,441	22	do	No 3,058	9	do	No 3,684
22	do	No 2,457	22	do	No 3,700	9	do	No 3,81
22	do	No 2,301	22	do	No 3,700	9	do	No 2,1

Sept. 9.	Order No. 3,973.....	\$13 00	Oct. 23. do No. 4,491.....	\$8 73
9.	do No. 3,778.....	11 00		
9.	do No. 4,034.....	13 40		\$21,755 97
9.	do No. 3,789.....	6 00		
9.	do No. 4,012.....	9 00		
9.	do No. 3,919.....	6 50		
9.	do No. 3,349 and 3,350....	56 00		
9.	do No. 4,283.....	29 00		
9.	do No. 4,286.....	6 25		
9.	do No. 4,288.....	12 00		
9.	do No. 4,277.....	6 75		
15.	do No. 2,406.....	11 75		
15.	do No. 1,808.....	44 00		
15.	do No. 3,095.....	17 50		
15.	do No. 2,955.....	13 00		
15.	do No. 2,956.....	13 00		
15.	do No. 3,408.....	20 00		
15.	do No. 3,218.....	22 30		
15.	do No. 3,402.....	29 00		
15.	do No. 2,494.....	9 10		
15.	do No. 3,530.....	29 15		
15.	do No. 3,110.....	12 60		
15.	do No. 3,274.....	6 25		
15.	do No. 3,433.....	12 40		
15.	do No. 3,724.....	24 25		
15.	do No. 3,640.....	5 50		
15.	do No. 3,650.....	10 40		
15.	do No. 69.....	46 52		
15.	do No. 2,652.....	8 43		
15.	do No. 3,420.....	29 50		
15.	do No. 2,816.....	7 00		
15.	do No. 79.....	296 45		
15.	do No. 59.....	294 00		
15.	do No. 272.....	6 28		
15.	do No. 107.....	228 15		
15.	do No. 18.....	80 12		
15.	do No. 13.....	20 55		
15.	do No. 54.....	27 30		
15.	do No. 53.....	107 90		
15.	do No. 3,244.....	101 62		
15.	do No. 3,004.....	62 67		
15.	do No. 3,392.....	20 41		
15.	do No. 3,740.....	33 20		
15.	do No. 3,670.....	15 50		
15.	do No. 3,733.....	9 40		
15.	do No. 3,077.....	19 25		
15.	do No. 3,749.....	11 00		
15.	do No. 3,939.....	23 00		
15.	do No. 4,036.....	19 40		
15.	do No. 4,642.....	13 40		
15.	do No. 3,983.....	43 75		
15.	do No. 4,085.....	3 05		
15.	do No. 4,081.....	3 05		
15.	do No. 4,140.....	2 57		
15.	do No. 4,097.....	2 57		
15.	do No. 4,290.....	2 72		
15.	do No. 3,986.....	15 90		
15.	do No. 4,233.....	28 55		
15.	do No. 4,223.....	24 25		
Sept. 26.	do No. 97.....	131 58		
26.	do No. 3,246.....	52 44		
26.	do No. 4,166.....	18 00		
26.	do No. 4,201.....	80 12		
26.	do No. 4,129.....	35 84		
26.	do No. 4,170.....	17 75		
26.	do No. 125.....	43 50		
26.	do No. 4,006.....	108 80		
26.	do No. 118.....	15 00		
26.	do No. 3,482.....	93 40		
26.	do No. 109.....	98 25		
26.	do No. 3,829.....	4 57		
26.	do No. 3,830.....	4 87		
Oct. 14.	do No. 131.....	10 45		
14.	do No. 4,404.....	55 50		
14.	do No. 4,393.....	9 00		
14.	do No. 4,576.....	13 25		
14.	do No. 4,329.....	25 25		
14.	do No. 4,611.....	8 95		
14.	do No. 4,118 and 4,378....	41 95		
21.	do No. 114.....	12 50		
23.	do No. 3,621.....	99 73		
23.	do No. 3,871.....	84 70		
23.	do No. 4,001.....	4 00		
23.	do No. 173.....	209 77		
23.	do No. 4,214.....	142 38		
23.	do No. 96.....	603 50		
23.	do No. 4,142.....	122 90		

Fund for cleaning streets (not included in street cleaning contract).

1869

Jan. 24. R. C. Brown, work in 12th Ward..... \$496 00

Sept. 23. R. C. Brown, work in 12th Ward..... 447 75

Oct. 10. R. C. Brown, work in 12th Ward..... 285 25

Nov. 2. R. C. Brown, work in 12th Ward..... 282 00

\$1,691 00

Fund for execution of orders in Kings county.

1869.

Aug. 4. Amount paid James Boyle for execution of order No. 437..... \$72 13

Town of Yonkers.

1868

Feb. 25. Amount paid Dr. J. H. Pooley for services as assistant inspector for year 1867..... \$440 00

Town of Morrisania.

1868.

July 23. Amount paid Dr. N. K. Freeman for services as assistant inspector for year 1868..... \$225 58

Town of West Farms.

1868.

July 28. Amount paid Dr. N. K. Freeman for services as assistant inspector for year 1868..... \$225 58

Town of Rye.

1868.

May 30. Traveling expenses of Sanitary Inspector White to Portchester by order of the Board..... \$6 40

Town of Newton.

1868.

Mar. 23. Amount paid Dr. Geo. P. Wright for services as assistant inspector for year 1867..... \$225 00

May 30. Incidental expenses of Sanitary Inspector Brown at Hunters' Point by order of the Board, 2 25

\$227 25

Temporary Loan Account.

1868.

Feb. 25. Amount refunded Nat. Shoe & Leather Bank*..... \$100 00

27. Amount refunded Nat. Shoe & Leather Bankt..... 115 39

Mar. 31. Amount refunded Nat. Shoe & Leather Bank†..... 392 00

\$667 39

\$164,401 89

* Borrowed in 1866 for town of Yonkers.

† Borrowed in 1866 and 1867 for town of Newton.

RECAPITULATION.

General Expenses—

Salaries.....	\$41,961 49	
Contingent expenses.....	2,795 89	
Advertising	314 25	
Law expenses	810 00	
Stationary and printing	9,941 55	
Office furniture	333 75	
	<hr/>	\$56,156 93

New York County—

Commissioners	\$7,416 66	
Sanitary Inspectors	18,575 00	
Assistant Inspectors.....	3,533 33	
Registrar of Vital Statistics	3,500 00	
Clerks to Registrar.....	13,371 00	
Clerks in Disinfectant Department.....	1,250 00	
Clerks in Sanitary Police Office	1,200 00	
Contingent expenses.....	7,656 54	
	<hr/>	56,502 53

Kings County—

Commissioners	\$4,583 33	
Assistant Sanitary Superintendent.....	3,500 00	
Deputy Registrar of Vital Statistics	2,400 00	
Clerks to Assistant Sanitary Superintendent.....	4,643 28	
Sanitary Inspectors	9,000 00	
Assistant Inspectors	1,460 00	
Contingent expenses.....	978 52	
	<hr/>	26,565 13

Fund for execution of orders in New York county.....	21,755 97	
Fund for cleaning streets not included in contract	1,691 00	
Fund for execution of orders in Kings County.....	72 13	
Town of Yonkers.....	400 00	
Town of Morrisania.....	228 58	
Town of West Farms	228 58	
Town of Rye.....	6 40	
Town of Newtown.....	227 25	
Temporary loan account	567 39	

\$164,401 89

Balance on hand Nov. 15, 1867, as per report.....	\$74,455 87	
Total receipts for year ending November 15, 1868....	181,252 24	
	<hr/>	\$255,708 11

Total Disbursements for the year ending Nov. 15, 1868.	\$164,401 89	
Balance on hand	91,306 22	
	<hr/>	\$255,708 11

METROPOLITAN SANITARY DISTRICT, ss:

Benjamin F. Manierre, being duly sworn, doth depose and say, that the accompanying Report contains a detailed statement of all moneys received and paid out by the Metropolitan Board of Health, and a "detailed statement of the manner of expending" of such money, from the fifteenth day of November, 1867, to the fifteenth day of November, 1868, and further saith not.

BENJAMIN F. MANIERRE, *Treasurer.*

Sworn before me this 5th day }
of December, 1868. }

D. B. HASBROUCK,

Notary Public.

The undersigned Commissioners, Auditing Committee of the Board, have examined the foregoing accounts of the Treasurer and found them to be correct.

GEO. B. LINCOLN.
M. T. BRENNAN.

NEW YORK, Dec. 7, 1868.

APPENDIX.

"A."

Report of the Sanitary Superintendent.

OFFICE OF SANITARY SUPERINTENDENT, }
METROPOLITAN BOARD OF HEALTH, }
NEW YORK, November 1st, 1868.

To the Secretary of the Metropolitan Board of Health:

I have the honor to submit the following report of the duties performed by the officers and employees of the Board of Health under my superintendence, and by myself during the past year.

The record of the past twelve months, like that of the preceding year, is one of steady improvement in the sanitary condition of the Metropolitan District. The unusual immunity from disease which followed the cholera visitation of '66 has continued uninterrupted to the present time. There has been no cholera or other epidemic, and, notwithstanding the severe and protracted heat of the past summer and the consequent large number of cases of sunstroke, the public health has still improved. The arrival at one time of some unhealthy cattle from the West, broken down apparently by the intense heat and prolonged and painful transportation, created some slight apprehension; but the sale of these cattle for food was prevented by the prompt action of the Police, and the disease disappeared with the subsidence of the hot weather. As a special Committee are to report upon the peculiar characteristics of this disease, and the best mode of preventing a recurrence of the same, no further mention is requisite here.

The duties imposed upon the Sanitary Inspectors have been of the same general character as heretofore, and, while these officers have labored with undiminished energy and interest, their efficiency has largely increased by reason of their extended experience and thorough acquaintance with their several districts, and their familiarity with the best methods of preventing or abating sources of peril to the public health.

The comparatively ready acquiescence on the part of property-owners in the orders which have been founded upon the inspections and reports of these officers, is the best evidence of the justice by which they have been guided. As heretofore, they have adhered to the principle that they are not partizans of any person or class,—neither of the person complaining of an alleged nuisance, nor of the person responsible for its existence. Either of these may act from ignorance, prejudice or malice. With the intention

the Inspector has nothing to do. His duty is simply to investigate the facts and present an unbiased report thereon. He is an officer of a Board, created simply to protect the public health, and if, in so doing, it become necessary to make the convenience or profit of the private individual give way to the good of the public, it is done with as little expense and publicity,—as little prejudice to his pocket and his good name as is possible. It has been in consequence of this principle, as well as in accordance with the taste of the Inspectors, that the labors of these officers have been as quiet as they have been energetic, and that the results in improved ventilation, increased cleanliness and the many other preventives of disease are known to so few persons other than those immediately interested.

The organization has remained the same as originally formed, and the same officers fill the positions now as did a year since, with one exception, Dr. J. Haven Emerson, one of the original appointees of the Board, and one of its most accomplished and efficient officers, resigned his position as Sanitary Inspector on January 31st, 1868. The vacancy, thus created, was filled by the appointment, on the 4th of February, 1868, of Dr. Charles C. Lee, selected on account of the able and faithful service which he had rendered as Assistant Sanitary Inspector, during the summer of 1866.

During the past summer, the following gentlemen have been appointed and performed duty as Assistant Sanitary Inspectors in the city of New York:

Dr. Lucien Damainville, Dr. Benjamin Howard, Dr. Wm. H. B. Post, Dr. Samuel A. Raborg, Dr. Charles F. Roberts, Dr. Albert Strang, Dr. Francis A. Thomas, Dr. Samuel D. Wadsworth, Dr. Whitman V. White, Dr. John Winslow.

The following have held similar positions in the suburban districts:

Dr. E. S. F. Arnold, Yonkers, Westchester county.

Dr. George Bayles, Greenburgh and Mount Pleasant, Westchester county.

Dr. G. J. Fisher, Ossining, Westchester county.

Dr. Norman K. Freeman, Morrisania, Westchester and West Farms, Westchester county.

Dr. George F. Jackson, Fort Washington, N. Y.

Dr. William O'Meagher, Richmond Co., S. I., N. Y.

Dr. Philander Stewart, Courtlandt, Westchester county.

Dr. George P. Wright, Newtown, L. I., N. Y.

Since the last annual report, November 1st, 1867, beside the general supervision of the District, the following inspections have been made in the cities of New York and Brooklyn, and have been the basis of reports:

Total of inspections made.....	42,603
Total of inspections made per month	3,550.2
Total of inspections made per week	819.2
Average number made by each Inspector per year.....	2,840.2

Average number made by each Inspector per month.....	236.6
Average number made by each Inspector per week	54.6

The following have been the subjects of the above inspections:

Tenement houses.....	23,316
Private dwellings	3,265
Slaughter-houses, establishments for fat-melting and bone-boiling, &c., manufactories, and other places of business	1,381
Horse and cow-stables and piggeries	936
Streets, piers, sidewalks and gutters.....	1,371
Sunken and vacant lots, manure heaps and dumping grounds....	1,008
Public buildings	157
Shipping.....	44
Yard, cellars, waste pipes, privies, &c.	11,125
Total	42,008

Two thousand six hundred and sixty-one (2,661) complaints of citizens have been received at the office of the Sanitary Superintendent, and investigated by inspecting officers of the Board.

To the report of my colleague, Dr. Conkling, Assistant Superintendent for Brooklyn, I beg respectfully to refer for the history of the management of the business of the Board in that city.

The Sanitary Inspectors have, as heretofore, kept their respective districts under constant supervision, inspecting every portion of them repeatedly, and rendering their semi-weekly reports of duty to the Sanitary Superintendent, accompanied with the separate complaints against all nuisances discovered during the period reported upon.

The prominent sources of offence have been essentially the same as in previous years; but as each one receives special notice in the general report of the Board, I will only dwell upon such as have necessitated some action by the Department, other than the ordinary and routine method of abatement.

Conspicuous among these is the business of fat-melting, or the manufacture of tallow. The various establishments where this business has been conducted have, until the last six months, given the department a great deal of labor and trouble. The number, however, of such establishments is now very much diminished, and the apparatus used is so far improved as almost entirely to deprive the mere process of "rendering" of its objectionable features. The fat being placed cold in a perfectly steam-tight tank, is kept there until the process of boiling is completed, while the emanations therefrom are conducted through a condenser, and thence discharged, in the form of water, into the sewer. This plan is now in almost universal use for this business, the old plan of boiling in open kettles being but rarely indulged in. But while this certainly renders the boiling itself a comparatively inoffensive process, it by no means obviates the many nui-

sances which attach to other details of the business, and which render it so necessary to abolish, as soon as possible, all such independent establishments, and cause the business to be conducted in immediate connection with slaughtering. No perfection in the apparatus at these factories can obviate the nuisance which is occasioned by the transportation of the refuse of slaughter-houses through the streets of the city. In my opinion, the only efficient method of permanently abating the offences which result from the disposal, in various ways and at various and often distant points, of the said refuse, is to cause the same to be done in connection with the slaughtering, and on the same premises. No transportation would then be necessary; no accumulations and consequent decomposition would then take place, and all the various materials, fat, bones, offal, etc., would be utilized while fresh and inoffensive. Many existing slaughter-houses are without rendering apparatus or the facilities for erecting and properly using the same. The only feasible plan is to concentrate all branches of the business, from the reception of the live cattle to the delivery of the meat on the one hand, and, on the other, of the tallow and other products of the utilization of such portions of the cattle as are not used as food. Already ample provision has been made for this result, and it is to be hoped that after the first of January, 1869, the numerous and offensive slaughter-sheds, the dangerous driving of cattle, the establishment for bone-boiling, fat-melting, gut-cleaning, etc., and the disgusting transportation of offal through the streets of New York, will be altogether things of the past.

Another most important business which has always constituted a most grievous nuisance has, during the the past year, been vastly improved. I refer to the reception and disposal of the dead horses and other animals gathered from the streets of the city. Until within a comparatively short period this was effected by collecting the carcasses at the dock, situated at the foot of 38th Street, North River, and thence transporting them down the bay, passing among the passenger boats and other shipping, to Barren Island, there to be rendered into useful material. This accumulation and subsequent transportation filled the atmosphere in the vicinity with most offensive odors. Now, on the contrary, the carcasses upon reaching the dock, are received at once upon floating factories, where they are immediately skinned, disemboweled, cut up, placed in tight tanks and subjected to the rendering process in apparatus of the most perfect character, and very little offence results therefrom; no more, in my opinion, than unavoidably attaches to the disposal of animals found dead in the streets. This plan was undertaken and perfected by the "New York Rendering Company," which now holds the contract for "the removal of dead animals, etc." The only objectionable feature that I know of in this contract is, that at this dock also is received and disposed of the offal from slaughter-houses. The handling of this offal, often brought in a putrid condition, still made this establishment a nuisance, and unjustly reflected discredit upon the

mode of disposing of dead animals, until the company, under the direction of the Board of Health, and at considerable expense to themselves, made constant use of carbolic acid (re-distilled heavy oil) as a disinfectant. When the whole business of slaughtering and utilization is concentrated, as set forth above, this source of trouble will no longer exist.

Notwithstanding the conspicuous character of these nuisances, and of many others which it is unnecessary to allude to here, they are by no means the most deadly enemies of the public health. Indeed, the very fact that they are so conspicuous, and create so intense a disgust, deprives them of much of their power for evil. Citizens at once are warned of the danger, and either fly from it, or by loud and irresistible complaint secure the interference of the authorities. It is in the insidious, unrecognized poison which originates and develops within the very walls of the citizens' dwellings that is found the most prolific cause of mortality in closely inhabited communities. In fact, by far the worst feature of these outside nuisances is, that in the attempt to escape them, we shut ourselves up with a far more certain destroyer. Still, as in years gone by, we have to point to our crowded, ill-ventilated and filthy tenements as the sources whence come the swollen records of mortality.

I cannot better show the success which has attended the labors of the Board to alleviate these conditions than by quoting from the annual reports of the Sanitary Inspectors upon this subject. I respectfully invite attention to them.

Extract from Report of Sanitary Inspector A. W. MacLay, M. D., First District, bounded north by Fourteenth street; south by East River and Battery; east by Catharine street, Bowery and Third Avenue; west by Broadway.

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"There are in this District about two thousand tenement houses, which are contained within the Fourth, Sixth, Fourteenth and a part of the Fifteenth wards of the city of New York. The number of this class of dwellings not included within these limits, but forming a part of the District, viz: the Second ward and a part of the First ward, is inconsiderable, and is every year diminishing. It may be stated as a general fact that nearly one-half of these tenement houses have undergone some substantial sanitary improvements. The more important provisions of the Tenement House Act have been very generally complied with, and in such cases where, from the inherent obstacles presented by the original faulty construction of buildings, such compliance has been found impracticable, very desirable changes have still been effected. Very few new buildings for the accommodation of the laboring classes, however, have been erected during the year. The tenement houses in this Sanitary District being for the most part old structures, which were formerly private residences, and not intended for many families, are not so susceptible of improvement, or of the necessary changes for light and ventilation required for their sanitary improvement, or by the provisions of the Tenement House Act. As a consequence, some of these improvements cannot reasonably be looked for until the houses themselves shall have given place to other structures. The widening and extension of Chamber street, some time since, was a step in this direction. The widening of Worth and Park streets also, which has been determined upon, will

necessitate the removal of some of the worst of these old tenements in the First Sanitary District. It is proposed to carry Worth street through to Mott street, widening Park street and taking away parts of Mulberry, Mott and Baxter streets. This part of the Sixth ward contains a crowded population, where all sanitary regulations are with difficulty enforced.

DRAINAGE AND SEWERAGE.

"The District is, as a general thing, very well provided with street sewers, and increased attention has been given to their junction and slope. In a part of Cherry street, and throughout Rose street, new sewers have been recently constructed, and the different tenement houses in these streets have been, for the most part, connected with these sewers, and much needed facilities for house drainage have been thus obtained. In many instances the action of the Board was needed for this improvement, but in others it was voluntarily undertaken. Throughout the entire District sewer connections have multiplied during the year. Much difficulty, however, has been experienced in many cases of faulty construction. Where orders have been issued to connect the premises with the street sewer, the owners of property, aiming rather at economy than thoroughness, have complied with the letter but not the spirit of the law, simply connecting the old privy vault by a six inch pipe, and neglecting a proper alteration, construction, flushing and water supply. Frequent complaints consequently arise from this cause. Indeed, in a majority of cases the attention of the Sanitary Police is called, not so much to the absence of sewer connections, as to obstructions in them. Some improvement in this respect has been made in several large tenement houses. The plan of water closets, seen in the public school edifices, has been adopted.

"Complete and effective house drainage is of such paramount importance that a good sanitary condition of premises densely occupied is never found where it is wanting. Great attention has been given to this subject in other countries, and especially in Great Britain, as is evinced by the several public health acts, and the admirable instructions, also, issued under them for the local authorities, inspecting engineers and medical officers. It was found that the essential requisites for effective house drainage were 'that the sewer should have a good fall, be laid on a firm bed, and such straight lines, with a gradual inclination from the highest to the lowest point, that it should be possible to see through each length, as it is being constructed. When it is necessary to change the direction, regular curves and not sharp bends or angles, or sudden changes of level, should be adopted. The sewer should be of such a size and shape as to enable the water passing through it to scour out all deposit, and a complete flushing should be insisted upon daily.'

VENTILATION.

"The beneficial results of the passage of the Tenement House Act are especially seen in the improvements in the ventilation of the sleeping-rooms of tenement houses in this Sanitary District. The second section of this act requires that "in every room, which is occupied as a sleeping-room, and which does not communicate directly with the external air, a ventilating or transom window over the door leading into the adjoining room, and also leading into the hall," shall be constructed. This form of ventilation has been enforced, and now very generally prevails in the District. Yet, here and there, the unwillingness of the tenants to accept a sanitary good, even when gratuitously provided for them, has been manifested. The Board directed, last winter, that ventilating windows of this description

should be constructed in the dark, unventilated bed-rooms of eight large tenement houses in Mott street. The owner of the property, when notified, promptly complied with the order, and windows were cut, securing light and air from the hall. Some little time after the tenants themselves boarded these windows up, preventing any means of ventilation whatever, and preferring a foul to a pure atmosphere.

"Another mode of ventilation has been adopted. I refer to the ventilation secured by the construction of a ventilator in the roof of tenement houses, at the top of the hall. Many of these houses have been thus altered, and the number of these alterations is constantly increasing.

"The population of the city of New York, according to the Census of 1860, was 813,669. The fact that of this number one-half live in tenement houses, explains and justifies the increasing interest felt in the character of these habitations, and the necessity for those sanitary measures which are now in successful operation for their improvement in regard to construction, ventilation, over-crowding, and the removal of local filth.

ASHES, GARBAGE AND RUBBISH.

"The abatement of the nuisances arising from the neglect of the more prompt removal of ashes, garbage and rubbish, is still demanded. The barrels, boxes, etc. which contain the refuse, are often left exposed on the side-walks until they are broken and their contents scattered. Inasmuch as the present contract system has proved inadequate to accomplish what is desirable in this connection, some other mode of relief would seem to be required.

"But, in justice to the present contractor, it ought to be observed that a marked improvement has taken place during the past year over those which preceded it. There is a pressing need of some form of approved garbage-box, graduated in size according to the number of tenants using it, and constructed of such material as would render it more safe from destruction, and prevent its contents from leaking and being scattered. This desideratum might be secured by the construction of solid wooden boxes, lined with zinc, or the substitution of galvanized iron for wood.

YARDS, HALLS, ALLEYS AND AREAS.

"Very gratifying changes are noticeable in the condition of the halls, stairs, alleys and yards of the various tenement houses. More attention is paid to keeping them in a cleanly state. In consequence of the vigorous enforcement of sanitary measures in reference to these parts of the dwellings, housekeepers or janitors have been selected from the more intelligent tenants, who exercise a general supervision, requiring from the other occupants a strict observance of cleanliness in the yards and stairways. Complaints in relation to the violation of such cleanliness, and for the removal of filth and refuse, have become much diminished.

BASEMENTS AND CELLARS.

"The cellars in this District, which are the most objectionable, are found in Cherry, Oak and Water streets. Some of these cellars (few however in number), which were entirely below the ground, damp and incapable of being ventilated, were closed by order of the Board, and are no longer used as human habitations. An improvement has taken place in the condition of those which are still thus used. Stagnant water has been drained, and better ventilation has also been secured.

The same difficulties, however, in the Application of the Tenement House Act to these parts of tenement houses still prevail. Alterations are made with reluctance, owing to the expense involved, and the law has been indulgently administered.

"The cellars, situated in the Fourth Ward, to which reference has been made, are occupied almost exclusively as lodging-houses. Often from fifteen to twenty lodgers are found in a single cellar. In the Sixth Ward the cellars are rented for the same purpose, but are more generally occupied by families. The cellar population, not only in this ward, but in the other wards of this Sanitary District, has decreased, and is decreasing. In Park street some exceedingly objectionable cellars were closed by order of the Board, as being under-ground, and continually damp and wet for want of drainage.

"More strict and general observance of lime washing, in such of these abodes as are occupied, is observable, and, when unoccupied, filth and refuse are not allowed to accumulate in them as heretofore." * * * * *

Extract from Report of Sanitary Inspector W. F. Deming, M. D., Second District; bounded north by Canal street; south by the Battery; east by Broadway; west by the North River.

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"The tenement houses that were built before the passage of the Tenement House Law were very faulty. Among those faults I will mention the absence of ventilation and light, particularly in the halls and bedroom throughout such houses.

"Nearly all of the old tenement houses in the First and Third wards had no connection with the street sewer, consequently it was a common occurrence to find the contents of the privy-vaults overflowing the yards, and sometimes in conjunction with the waste water from hydrants, etc., flooding the basements and cellars. Many of such basements were occupied by large families who were deprived of all the natural elements of comfort and health. During the summer of 1866 these low, dark and damp abodes were visited by many cases of miasmatic disease, interspersed by a case of genuine cholera now and then.

"Garbage boxes upon the sidewalks, in front of these houses, became great nuisances, so great that the Board of Health ordered them done away with, and caused the tenants to keep their ashes, garbage, etc., in barrels, pails and pans on the premises until the ash-man called for the same. This course has been a decided improvement upon the old system, and at the present time I am opposed to renewing in this District the old garbage box, or any kind of a receptacle to be placed upon the sidewalk, for the following reasons: If these boxes are placed upon the sidewalks in front of large tenement houses, all the waste water, such as slops, urine, etc., is thrown into them, along with the ashes and garbage. This compound causes very offensive odors to arise during the summer months. In the winter the mass remains frozen from fall to spring, totally defying all efforts to remove it therefrom.

"Since the summer of 1866 there has been a decided improvement in the tenement house property. Nearly all of the dark halls and bedrooms have been provided with proper ventilating windows, doors, etc. The halls and ceilings have been whitewashed twice a year, and the areas, yards and cellars have been kept clean and purified with disinfectants. Hundreds of the old privy-vaults have been emptied, disinfected and connected with the street sewer. The new tenement houses that have been lately erected are provided with modern water-closets, stationary wash-tubs, etc. If every family in these large houses could have a galvanized iron receptacle (with a handle on each side) capable of holding about two

bushels of ashes and garbage, it would be an improvement upon the present system of barrels or boxes, this iron receptacle to be kept on the premises, either in the yard or hall, until called for by the ash cart. I would suggest that this ash cart should (especially in the First and Third wards) collect such ashes and garbage twice a day throughout the year. In no other way can the tenants be prevented from throwing their surplus garbage, etc., into the street gutters in front of the premises.

"In conclusion I will state that owners and occupants of tenement houses are becoming more willing to comply with any suggestions from the Board of Health or its officers." * * *

Extract from Report of Sanitary Inspector Thomas H. White, M. D., Third District, bounded north by Fourteenth street; south by East River; east by Avenue A, Norfolk and Jefferson streets; west by Catharine street, Bowery and Third avenue.

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"The number of tenement premises within the limits of the Third District is about three thousand three hundred. Nearly sixteen hundred of these houses were in a bad sanitary condition. Of the total number, six hundred have been reported within the past twelve months as not conforming to the law, and have been altered in accordance with its provisions. Very many others have been improved voluntarily by their owners. About one-half of the total number were in a fair sanitary condition, and have required very little alteration. The improvements and changes required may be illustrated by referring to the following sections of the law in detail:

"SEC. 2. Insufficient ventilation of hallways and bedrooms has always been a prominent defect in the construction of tenement dwellings.

"This is owing to the desire to economize space at each end of the hallways, and to save expense. The ends of the hallways are thrown into the common living rooms, so that neither light nor air can enter the halls except through the entrances of the first floor and by means of skylights and scuttle holes in the roof.

"The only practicable remedy has been to construct ventilators in the roof. In most of the larger four and five story houses this has been accomplished by the construction of a stairway leading to the roof and terminating in a bulkhead with openings in its sides for light and air, the stairway also serving as a means of rapid and easy escape in case of fire. In the smaller three story houses the necessity for ventilation is not so great, and a skylight and scuttle hole have been considered sufficient, though in many cases small ventilators have been introduced.

"Nearly every tenement house is built with two or more dark middle bedrooms, situated between the front and rear living rooms. Most of these bedrooms have one window communicating with the adjoining kitchen, and, in some houses, with the hallway. In the latter case, if the window is of good size, about six square feet, no further means of ventilation have been required. But in all other cases it is deemed requisite to construct one additional transom window communicating with the hallway, if practicable, or with an adjoining room which communicates with the external air, the object being to have two windows in each bedroom so situated as to afford a current of air through the room. In a few front and very many rear houses, the situation of the stairway interferes with the insertion of hallway windows on one or two of the floors.

"The plan of ventilation by means of flues is inadequate and is now altogether discarded, it being found by experience that the openings into the flues are generally kept closed by the tenants, who regard them more as hiding places for ver-

min than as being of any practical use. This section of the law is highly appreciated by the occupants of tenement dwellings, and the attention of the Inspector is quickly called to its violation.

"The objection to hallway windows that they give access to thieves, has not been sustained, as the windows are not required to be more than three square feet in size, and can easily be protected by an iron bar. There are now very few houses in this District in which this section of the law has not been complied with.

"Under the direction of the Superintendent of Buildings, most of the larger, and many of the smaller houses have been furnished with fire escapes, consisting of iron balconies on each story, connected by a ladder, also of iron, extending from the roof to the first floor. In houses over three stories in height, stairways leading to the roof and terminating in bulkheads are also required.

"The more careful supervision which the enforcement of the law has caused owners and agents to exercise, is shown in the greater attention paid to the repairing of leaky roofs, leaders and broken banisters; trifling defects often, the remedying of which adds much to the health, comfort and safety of tenants. Complaints from these causes are much less frequent than formerly.

"A great improvement has been effected in the condition and appearance of many premises, by the establishment of sewer connections, the regrading of yards and alleyways, so that all waste water may flow into the privy-vaults; the removal of surface drains from alleyways, the connecting of leaders with drains, and the filling in of useless cesspools and cisterns.

"Nearly all tenement houses are now provided with sewer connections where a street sewer exists.

"The cellar population of the district has never been very large. In Cherry street there were a few cellars let out for lodging purposes, the condition of which was in flagrant violation of all sanitary principles. In one of these cellars, at No. 145 Cherry street, from twenty to thirty lodgers would be crowded at night into two rooms, containing together an air space of about four thousand cubic feet, the only means of ventilation being the doorway and one small window about three feet square. The use of such places for sleeping purposes is now almost entirely discontinued.

"In two cases, where the cellars are dry and adequate ventilation, has been secured by the construction of additional windows, special permits have been granted, allowing them to be occupied by small families.

"The present system of removing ashes and garbage is very imperfect. Theoretically, occupants are expected to bring out their boxes and pans at the time the ashman's bell gives notice that his cart is passing through the street. Practically, in the majority of cases, the boxes are carried out in the early part of the day and placed in rows on the sidewalk, where they often remain till night.

"The pans and boxes are usually full to overflowing, and their contents are scattered over the street by the wind, or are overturned into the gutter by mischievous boys, or by the goats which roam through many of the streets.

"A better plan would be to require the owners to provide two large boxes, for ashes and garbage respectively, which should be kept within the premises, and entrusted to the care of a housekeeper, or some responsible person, who should, with the assistance of the ashman, empty them daily into the carts. By this method not only would the sidewalks and gutters be kept clean and unobstructed, but the garbage could be collected separately and utilized.

"Under special permits from the Board, a few cellars and basements are still occupied as stables.

"The efforts of the Board to promote and enforce cleanliness have been attended by the happiest results.

"The responsibility for the appearance of the public portions of a house is now placed upon the owner, lessee or agent of the premises. This has led to the more frequent employment of housekeepers, whose duty it is to exercise a general supervision over the premises and keep them clean. It also stimulated the tenants to do their part in cleaning and whitewashing their own apartments.

"The necessity for semi-annual whitewashing does not seem to be fully understood. Most landlords whitewash their houses in the spring, but neglect to do so in the fall.

"Wherever the names of owners or agents are posted, there is now generally no cause for complaint in the condition of the premises. It shows a sense of responsibility and a regard for the welfare of tenants which is not without its effect upon the tenants themselves.

"The cellars of some houses in the lower portion of the district, bordering upon the water, are frequently rendered wet and filthy from the action of the tides, which can be remedied only by some alteration in the system of sewerage in those localities.

"The Inspector has met with no opposition in his visits during the past year.

"No contagious or infectious diseases have prevailed to such an extent as to render necessary the vacating of houses, though in a few cases disinfection has been ordered.

"It is believed that the mortality of the district has decreased.

"The remaining sections refer principally to the construction of new buildings, of which a large number have been erected during the year. The few that have been inspected have been found to conform to the law. The plan of ventilating dark, middle bed-rooms, by means of "wells" extending from the cellar to the roof, has been adopted in many new houses.

"The foregoing remarks indicate some of the reforms already accomplished by the enforcement of the "Tenement House Act". That it meets with the approval of the large class of the population which it was intended to benefit, is daily shown by the welcome extended to the Inspector, and the readiness to point out its violations, indicating that its provisions are understood as well as appreciated."

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Extract from Report of Sanitary Inspector James L. Brown, M. D., Fourth District, bounded north by Fourteenth street; south by Canal street; east by Broadway; west by North River.

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 "Speaking in a general way, three conditions may be said to be necessary for the sanitary well being of any tenement house: 1st. A proper construction of the house itself. 2d. A constant supervision of the same on the part of the owner or agent. 3d. A disposition on the part of the tenants to aid in the preservation of a good sanitary condition of the premises. A brief consideration of each of these points may serve to show, at least approximately, what has already been accomplished, and how far these several conditions are under the control or influence of the Board of Health.

"1st. The construction of tenement houses. Of the three conditions that have been enumerated, that which refers to the construction of tenement houses is undoubtedly the most important, and fortunately, also, the most under the control of legislation. In order, however, to properly appreciate the nature and extent of this

control, it must be borne in mind that the term "tenement house" is applied to dwellings that present the widest differences in respect of age, size, character of population and other conditions that greatly affect them, the only feature which they necessarily possess in common being their occupancy by more than three families. In the Fourth District more than one-third of the tenement houses were originally private dwellings, that have gradually degenerated into tenement houses of the worst description because never intended for more than one or two families. To convert these into really comfortable, well-ventilated tenements is in most cases impossible, their original construction forbidding it. All that can be done with reference to them is to introduce such improvements as the nature of the case will permit.

"It is chiefly in the western part of the Eighth ward and the southern part of the Ninth ward that this class of tenements most abounds. By the introduction of windows into dark bedrooms, the placing of ventilators in the roofs, the establishment of sewer connections with privies and kitchen sinks, the erection of fire escapes, the excavation of areas for the better ventilation of basements and cellars, together with such repairs and alterations as age and usage had rendered necessary, about one-half of these have been made to conform to the provisions of the Tenement House Law as fully as their construction would permit, and very many of them have been converted into comparatively comfortable and convenient dwellings. Of the remaining tenement houses, i. e., those that were originally designed as such, a few have been found so well constructed and kept as to require no interference on the part of the inspector. The great majority, however, are not of this class. In nearly all the ventilation has been found insufficient, the drainage defective, means of escape in case of fire either absent or inadequate, and defects due to want of proper repairs of constant occurrence.

"The number of houses improved in some or in all of these particulars is probably a little more than one-half of all the houses of this class.

"The number of *new* tenement houses erected in this district since the enactment of the Tenement House Law is probably not more than twenty.

"2d. A constant supervision on the part of the owner or agent, either directly or by proxy, is the second condition mentioned as being indispensable for the preservation of a good sanitary condition in any tenement house. In fact, provision is made for this in the requirements of the law itself, (see particularly section 9), and compliance with these provisions of the law has now become a general rule, although not to the same extent in all cases. In perhaps one-quarter of the larger tenement houses in the Fourth District it has become the custom to employ a housekeeper, who exercises a general supervision over the premises, and exerts a very salutary influence in preserving in them a good sanitary condition. The number of tenements thus provided with housekeepers is steadily if not rapidly increasing, and there is reason to hope that owners of this kind of property will ere long find it to be their interest to make it the rule rather than the exception."

"So far as my observation has extended, there is no requirement of the Tenement House law that has been more generally complied with than that requiring the walls and ceilings of the halls to be whitewashed, although its semi-annual repetition is not generally insisted upon or required. Although apparently not a matter of great sanitary importance, it has appeared to me to be as valuable from its moral effect upon the occupants, as in the improvement which it effects in the appearance and cleanliness of the premises.

"The number of complaints due to accumulations of filth or refuse matters in yards, cellars, alleys and like places has greatly diminished since the general en-

forcement of the Tenement House Law, the owner or lessee being held directly responsible for their existence. It is not to be denied, however, that a very large number of tenement houses, perhaps a majority, are yet in a condition far removed from even tolerable cleanliness; and in very many of them it is not easy to find an efficient remedy for this evil, which is due neither to the indifference of the owners nor the inefficiency of the health laws, but to the degraded character of some of the tenants, of whom we shall next proceed to speak.

"3d. The co-operation of the tenants in the preservation of cleanliness and good order is the *third* essential condition, and here legislation is almost powerless. In a great many of the better class of tenements, only such tenants are taken as are known to be respectable and likely to take an interest in preserving a good condition of the premises. But a very large part of our tenement house population is not of this kind, and the best efforts of owners and health authorities are sometimes neutralized by the ignorance, indifference or prejudices of these people. It has more than once happened to me to find the windows that had been placed in dark bedrooms by the Board of Health completely sealed by paper pasted across them, or pictures hung over them; newly made sewer connections completely clogged with ashes and garbage; and filth abounding everywhere. Fortunately this condition prevails only in the worst class of tenement houses, which, though a large class, is not the largest. Education would rapidly improve this part of our population, and abolish to a great extent this prevalence of filthy habits, were it not that the constant influx of immigrants of the most degraded description is continually recruiting their numbers and furnishing fresh material for sanitary supervision. There appears to be only one way to reach this evil, and that is to act upon the tenants through their landlords. If every such tenement house were to have a vigilant housekeeper, and prompt expulsion of the tenant were made to follow gross infractions of proper household regulations, such a pressure would be exerted upon the occupants as would compel general good behavior.

"By holding the landlord rigidly responsible for the condition of his premises, and making him pay the penalty of his tenants' misdeeds, there is reason to believe that self-interest will soon point out the most efficient way of dealing with such misdeeds, and few houses of this kind will be found unprovided with some such supervision. Already the plan has been adopted by many, and it only needs to become general to effect a great reform where it is most of all needed."

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Extract from Report of Sanitary Inspector Charles C. Lee, M.D., Fifth District, bounded north by Fourteenth street; south and East by East River; west by Jefferson and Norfolk streets and Avenue A.

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"In this portion of the city, consisting mainly of the Eleventh and Thirteenth Wards, are congregated about three thousand (3,000) tenements, which vary from a standard as nearly approaching perfection as such houses can, to the filthiest and most dilapidated of human dwellings. And as nearly all the difficulties and discomfort characterizing this class of dwellings seem to me attributable to overcrowding, to insufficient ventilation, want of cleanliness and defective sewerage, I have thought it best to confine the few remarks I have to make to these important points.

"1. The question of overcrowding in tenement houses is like any other simple question of supply and demand, clearly beyond the control of the Board of Health. As long as rents remain high, and houses scarce, it will not suffice to prescribe to

landlords the number of families that may occupy a tenement house, or each of its floors. The necessity of providing a habitation of some kind remains with the poor, and as long as a large class of destitute population exists in our midst, nothing but the increase of cheap dwellings, within easy access of the centres of work, can ever mitigate this evil. It is needless, therefore, to dwell further upon a source of complaint which is obviously beyond the reach of any official power.

"2. With the question of ventilation it is fortunately different. In the best class of tenement houses the bed-rooms, unless these be hall rooms which communicate directly with the outer air, are effectually ventilated by a shaft running from the ground floor to the roof, and communicating with each room; in addition to which each room has two windows, one opening into the hall, the other into the adjoining kitchen or sitting-room. Thus, if the bed-room door be closed (which is seldom the case), the tenant need only open both his windows to secure a steady current of air through the room and up the ventilating shaft. In the hall the stairs ascend directly to the roof, which is reached through an ordinary doorway, thus affording both a ready means of escape to the tenants in case of fire, and additional ventilation, for the roof door can always be kept open in good weather. The main ventilation of the halls is, however, effected by elevating the skylight upon lattice work, the slats being sufficiently inclined to turn the rain, and yet wide enough apart to permit the free escape of air from the hall.

"In the worst class of tenements no skylight exists; the roof is reached (if at all) only by an impracticable ladder and a narrow scuttle hole, which is always kept closed, and no means of ventilation are provided for the bed-rooms, except the doors. In such houses the bed-rooms are rendered still more insupportable to a stranger, by the filth in which they are habitually kept, and by the accumulation of old clothes and similar rubbish, for which the class of tenants that occupy them seem to have a singular predilection. The discomfort and disease that seem inseparable from such houses are, therefore, by no means due to the defective building alone, for its occupants are too commonly those that require instruction in the first principles of cleanliness and health.

"To overcome this defective ventilation has appeared to me one of the most important objects of the Board of Health when dealing with tenement houses; and when faithfully carried out, the provisions of the Tenement House Act are as effectual in attaining this object as any that could be devised. With the exception of the ventilating shaft, this law prescribes the means of ventilation for hall and bed-rooms, previously described; and, as closely as I can estimate from my note book, about seventy per cent of all the tenement houses I have inspected during the past year have been in bad sanitary condition from this cause, although very rarely from this cause alone. Of the number so reported, the defect has been remedied, before this date, in more than forty per cent, the owners complying promptly, as a rule, with the requirements of the act as soon as they appreciate that the law is impartial in its application. When such efforts have failed, it has usually been due to the impossibility of reaching the owner of the property, who, in some cases, lives beyond the jurisdiction of the Health Board, and has no responsible agent in the Metropolitan District. Such cases are, however, rare exceptions, and it is gratifying to the Inspector to report that, in the matter of ventilation, such decided improvement has been effected during the past year.

"3. As regards the increased cleanliness of tenement houses, much has been accomplished, undoubtedly, during the past year, but the desired standard is still far from being reached. As a rule, all but the filthiest class of tenants show some solicitude about cleaning and whitewashing their own apartments, but the vast

majority are totally indifferent to the condition of the stairways, halls and other public portions of the house. The theory in such houses is, that each family takes charge of the halls, washing the steps, etc., for a week in rotation; but in reality, as there is no personal responsibility, the offensive duty is shirked by all. As a natural consequence, when houses so tenanted are in the hands of house agents or of miserly or indifferent owners, filth and rubbish of all kinds accumulate in the halls, yards and cellars, the walls and ceilings are never whitewashed, the sewer and waste-pipes become obstructed, and the normal discomforts of a crowded and ill-constructed dwelling are increased a hundred fold.

"In the Fifth District the great mass of tenement houses inspected during the year, on a citizen's or policeman's complaint, come fairly within this classification, and are filthy from simple neglect of both landlord and tenant. In eight or ten such cases, of which I have preserved a memorandum, the appointment of a house-keeper, whose special responsibility (living on the premises) it is to superintend the halls and yard, has overcome all difficulties of this character.

"Where the owner resides in the house—as is the case in numbers of the better class of tenements, especially with the Germans—there is seldom cause for complaint in this respect. In other cases, nothing but the appointment of the house-keeper, with the supervision of the owner or frequent visits from the Inspector, suffices.

"The requirement of the Tenement House Act, compelling landlords and agents to whitewash their houses twice a year, has been rigidly enforced, and with the best effect. During the past month of October over one hundred houses, in one section of the Fifth District, underwent this purifying process.

"Another fruitful source of the filth of tenement houses, is found in the tenants' disposition of their garbage and the refuse of cooking. In some houses that have come under my notice, the usual custom (which is seldom deviated from) is to empty all the liquid refuse into the washing sink, with the vegetable parings and such small matters, while the bulk in material is thrown indifferently into the privy vault or cellar. Hence numerous difficulties and recriminations occur between landlord and tenant; and the responsibility of the removal of all such offensive matters falling only on the landlord, the true offender is never reached by the law. Tenants allege, as an excuse for this indifference, that if they remove their garbage to the street, their garbage box or other vessel is sure to be broken or stolen while waiting for the cartman. This excuse is undoubtedly well founded; but, although exceptional cases give trouble in this respect, the great majority of tenants keep their refuse rubbish and garbage in their own apartments and bring it down at the sound of the cartman's horn. Under the present system of street cleaning the entire method of the removal of garbage is radically defective, and can be improved only by substituting another and different system. If the Health Board could control the carts and cartmen, I believe the most efficient system would be a restoration of the large metallic garbage boxes for Tenant Houses, containing more than three families, and in all other cases the retention of the garbage, ashes, etc., in the house or yard until the cartman *enters and takes charge of it in person*. The large stationary boxes are in many respects objectionable, and were found so when the attempt was made to institute them two years ago; but in large Tenant Houses it would be impossible for the cartman to visit each separate family. Such stationary boxes, if ever introduced, should, I think, be metallic, provided with a locked cover, and (as a rule) kept on the sidewalk close to the wall of the house, like the present coal-bins; they would thus be less offensive than if in the hall or yard,

and also less liable to injury from vehicles and mischievous pedestrians than if located on the curb-stones.

"The subject of sewerage being one that gives rise to frequent discomfort and complaint, has especially received a large share of the inspector's attention. Within the past two years so many additional sewer connections have been made by the Health Board among the tenement houses of this section, that it is safe to say such a building is now seldom found on a street provided with a sewer, without a more or less complete sewer connection. Nine-tenths of the present complaints of this class refer to sewer *obstructions* and other difficulties, such as leakage, overflow, etc., arising from that cause.

"During the year, however, certain streets, as Sheriff and Columbia, between Houston and Rivington, portions of Willett, Henry and Madison streets, have been newly sewered; and the tenement houses in those localities have had sewer connections for the first time. In many of these cases, where the plumbing work is well done, and where the privy sink is not dug so deep as to be on a level with the street sewer, a decided improvement in the cleanliness and comfort of the premises follows the introduction of the sewer. This is especially noticeable in the few cases where water closets, provided with the proper traps, have been substituted for the privy-vault; but, to ensure the success of this arrangement, the supervision of a careful housekeeper is absolutely necessary."

Extract from Report of Sanitary Inspector Ed. H. Jones, M. D., Sixth District, bounded north by Forty-second street; south by Fourteenth street; east by Sixth avenue; west by North River.

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"Since the enforcement of the Tenement House law was commenced, all of the tenement houses in the Sixteenth ward, a large number in the Twentieth, and all of those in that part of the Twenty-second ward included in the Sixth district, have been inspected and so altered as to be made to conform to the Tenement House law, or are in the process of being so altered.

VENTILATION.

"Most of the tenement houses in the district are divided into front and rear apartments, the bedrooms being in the middle or between the front and rear sitting rooms, having no communication with the external air, and most of them had no means of ventilation except a door leading into the adjoining sitting or main room. A few of these bedrooms were supplied with windows communicating with the hall, and fewer still with ventilating flues in the wall; the latter of but little use for the purposes of ventilation. A scuttle in the roof could be left open during warm and dry weather, affording a current of air through the halls, but during rainy weather was always closed, leaving no means for the escape of foul air. In a house of this description, the improvement in regard to ventilation consists in supplying each of the middle bedrooms, if practicable, with two windows, one communicating with the hall and one with the sitting room, so arranged that they can be opened at any time, and thus afford a current of air through the room; and also a ventilator in the hall that can be kept open during all conditions of the weather, and by the help of the bedroom windows afford ventilation for the whole house. This section of the law has been rigidly enforced wherever the location of the bedrooms is such as to admit of the two windows mentioned.

FIRE ESCAPES.

"Under the direction of the Superintendent of Buildings, fire escapes have been attached to a large number of tenement houses in the district. These consist of iron balconies and ladders on the outside of the building, and the extension of the stairway within to the roof, on which is a bulkhead with door. I would here remark that in many instances I find this extension of the stairway so constructed as to seriously obstruct the light and ventilation of the hall.

ROOF, EAVES-GUTTER, LEADER.

"A leaking roof is a very common cause of complaint, and one exceedingly annoying to the occupants of the upper floor of a house where this defect exists. With few exceptions, complaints of this annoyance have received prompt attention. The eaves-gutter and leader are also by law required to be kept in good repair, so as to allow no rain from the roof to drip on to the ground or walls of the house. In enforcing the Tenement House Law the leader is usually extended to the privy vault, if such vault is connected with the sewer, and thus made to serve the double purpose of conducting the water away from the house and assisting to wash out the privy-vault. Where no sewer exists in the street, the leader is usually made to so discharge that its contents will reach the street gutter by means of a drain extending under the flagging of the sidewalk. It is very seldom that a cistern is found for receiving rain water in the Sixth District.

PRIVIES AND WATER CLOSETS.

"The filthy condition of many of the privies connected with tenement houses has long been recognized as a prolific source of febrile and diarrhoeal diseases, as well as being revolting to the senses and degrading to the morals of their unhappy frequenters. Where sewer connections existed, many of such connections were found to be of wood or brick drains so defective in their construction as to allow foetid gases to escape, and often the fluid contents to overflow the cellar and even penetrate to the adjoining premises.

WASTE PIPES.

"Where the waste pipes of a house connect with the sewer drain, unless properly trapped, they afford ventilators for the escape of sewer effluvia into the houses. Wherever this nuisance has been found, it has under the Tenement House Law been promptly abated.

BASEMENTS AND CELLARS

have received attention, and so far as inspected have been made to meet the requirements of the law. The improvements consist in providing for the admission of light, in proper ventilation and drainage. Unless apartments of this class are put in the proper sanitary condition, permission for their occupancy is withheld. I would here remark that in the Sixth District there are few basements that cannot be put in a fair sanitary condition.

CLEANLINESS.

"The section requiring the whitewashing of the halls twice a year has had a wholesome effect, both on landlords and tenants, creating more care in the general condition of the premises on the part of the former, and in some degree imbuing the latter with a spirit of emulation regarding the walls of their own apartments,

the result being a growing attention to general cleanliness. The effect of the sanitary inspection and improvement of tenement houses is seen not only in the condition of the apartments but in the increased tidiness, in many instances, and cheerfulness of the occupants. In instituting this reform in the condition of their dwellings, the Board has not only contributed to the sanitary wants of the poorer classes, but has taken the first step towards elevating them in the scale of intelligence, morality and virtue."

Extract from Report of Sanitary Inspector James W. McLane, M. D., Seventh District, bounded north, by Forty-second street; south, by Fourteenth street; west, by Sixth avenue; east, by East river.

"The Tenement House Act, than which none could have been more necessary and proper, was considered by many of the large owners of tenement property as onerous and unjust, and they were very slow in complying with its provisions at first.

"A very healthy change has taken place during the past year in the minds of owners and agents of Tenement Houses. They have ceased to make objections to the requirements of the Law, and under the healthful stimulus furnished by the legal arm of the Board, they have in many cases readily complied with its provisions.

"Nor has the compliance in all cases been compulsory; I know of many landlords who have taken an interest in placing their houses in a sanitary condition, and have made alterations in their construction, involving a considerable outlay, though they had received no order or notice from the Board.

"The Law, in my opinion, as well as the mode of its execution by the Board, is steadily gaining favor among all classes, and there are a very few houses, if any, in my District which are not in a better condition, both as regards construction and cleanliness, than before its enforcement.

"Prior to the passage of this act and the organization of the Board of Health, the owner of a tenement house knew little about it; never visited it except to collect rents, and took no thought for the preservation of the health of his tenants, and the prevention of diseases. But the Metropolitan Health Law, and the Tenement House Act gave him a position of considerable responsibility, and, as a result, he either has accepted the responsibility and become a better landlord, or sold his house. Not a few pursued the latter course, and thereby conferred a great benefit upon the community.

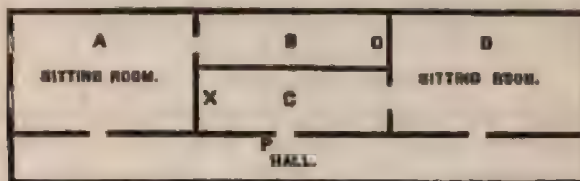
"In my experience the tenement houses of New York are now owned by a different class from that which had possession two years ago. Then faulty construction, deficient ventilation, privies without sewer connection, were not matters to which public attention had been called; the houses were over-crowded; damp basements and dark cellars were used as dwellings; few if any repairs were necessary, and money invested in this kind of property returned a handsome interest.

"Now the case is very different. The men who once owned twenty or thirty of these houses, now own none. The present owners are in very many instances the occupants, who have altered the construction of the houses, where such changes have been necessary, and take a pride in conforming to the requirements of the Law, and keeping their houses clean. There are no tenements so well kept as those in which the owner himself resides; the majority of such owners are thrifty Germans who have invested the 'res augustæ domi' in their house, and let out several of the floors. They exercise a constant supervision over the halls and stairways, the yards, areas and privies, of their premises, and these are kept scrupulously clean.

VENTILATION.

"In very many houses the sleeping-rooms were formerly dark, having no windows communicating either with the adjoining room, or with the hall of the house, and the evils resulting from the entire lack of ventilation were great. The air in these rooms was almost never changed, and as three or four persons slept in them, night after night, the atmosphere became laden with organic matter, and on going into them I have often experienced a sense of heaviness, and even nausea. Of course the aeration and nutrition of the blood of those who occupied these *chambers* at night was seriously interfered with. I have found children lying sick in such rooms with eruptive fevers, the severity of the disease being increased by the foul atmosphere, in my opinion, and convalescence greatly retarded. The great majority of such rooms are now ventilated by transom windows, opening not only into the adjoining sitting-room, but communicating also with the halls of the house, by which a free circulation of air is ensured.

"There are still some bed-rooms which have no ventilation, owing to the faulty construction of the house. They are generally inside rooms, in which windows cannot be cut without establishing communication with a bed-room occupied by another family. The houses so constructed should, in my opinion, be either so altered as to render ventilation practicable, or else the owners should be prohibited from letting the rooms upon any one floor to more than one family. Legislation upon the latter point is, I think, required.



"The above diagram will illustrate my meaning. The room (B) is the sleeping-room attached to the sitting-room (A). The sleeping-room (C), that belonging to room D. Now room (C) can be easily ventilated by a hall window at (P), but the room (B) cannot be ventilated by a window, because a connection would thus be established between the sleeping apartments of two different families. If only one family occupied the floor, the evil could at once be remedied by cutting a window at the points X and O.

"The halls of most of the houses in my District are now better ventilated than formerly, owing to the construction, in the roofs, of ventilators, so that there is now a constant current of fresh air passing through the halls, from the street door up the stair-ways to the roof.

"The construction of these ventilators has, however, in many instances, been the cause of diminishing the light in the halls of the house, which I regard as unfortunate. A dark hall, where sunlight never comes, is apt to be a damp and dirty one. Light is, in my opinion, a necessity in the halls of a tenement house.

"When the ventilator has been placed in the door of the staircase leading to the roof, or on the top of the bulkhead, such staircase or bulkhead has generally taken the place of the skylight which formerly existed, and in consequence the halls are now so dark that it is difficult to grope ones way about even at noon-day. Of course it is well nigh impossible to keep the floors and stair-ways clean under these

circumstances. The remedy for this evil is, in my opinion, the removal of the small rooms which there are usually at either end of the halls. By so doing the halls could be well lighted, well ventilated, and kept clean.

WATER-CLOSETS AND PRIVIES.

"In these the improvement is very marked. Large numbers of privies have been connected with the sewers during the past year, and this sewer connection has, in some instances, been of advantage, in others not.

"Some old-fashioned vaults have been cleaned out and filled up with fresh earth or ashes, and new privy-sinks constructed, or water-closets connected with the sewer, and with an adequate water supply.

"In other cases a sewer-pipe has been laid from the street to the existing privy-vault, and no means provided for flushing the same. As a consequence of such improper connection, the condition of the privy is worse than before, for, in my opinion, a sewer connection with an insufficient water-supply is worse than useless, as it has the appearance of efficiency without the reality. In all tenement houses there is a sufficient water supply, if it were only turned in the right direction; but in many cases this is turned to no good account, but wasted.

"If the hydrant-waste be conducted by a drain to privy-sinks, and the rainfall were conveyed by leader to the same, there would be no difficulty in keeping the sewer-pipe clear, even with scarcely any fall.

"In quite a number of cases water-closets have been substituted for privies, and the former are preferable, in my opinion, for tenement houses. There is no difficulty in keeping them clean, where a housekeeper or agent exercises a proper supervision.

FIRE ESCAPES.

"Great progress has been made during the year in furnishing these houses with adequate means for the escape of the inmates, in case of fire. Staircases and bulk-heads have taken the place of the old fashioned scuttle and ladder, and there are now very few houses in which a large number of families reside, where there is not some fire escape provided. In many, there is, besides the bulkhead leading to the roof, also an iron fire escape on the outside of the houses.

WHITEWASHING AND CLEANING.

"The walls of the halls present a much cleaner appearance. Owners, in many cases, have all the walls of the public parts of the house whitewashed, twice in the year, and require their tenants to whitewash their own apartments. Tenants are also required to scrub the public halls and stairs once in the week, as well as the floor and seat of the privy building. As each tenant takes his turn, the duty does not come around to any one very often, so that this requirement is not an irksome one, and ensures a cleanliness about the house which was never seen two years ago. In some houses a notice is posted to the effect that all tenants are required to perform their share of this work.

"In making inspections now, it is the rule, and not the exception, to find the doors of the privy buildings locked. Each tenant has his own key, and is held responsible for the condition of his section of the privy. This is a great improvement. Formerly it was impossible to preserve these places in a condition even of decent cleanliness, but now they are often as neat as those belonging to private dwellings.

"There is no requirement of the Tenement House Act which owners and agents are so reluctant to comply with, and with which so few have complied, in my Dis-

strict, as that which relates to the posting of the names in the hall of the house. Various reasons have been given for this. Owners are afraid of being annoyed by the calls of tenants, who, they say, would come to make complaints, or to beg for reduction in rent, and in other ways cause them trouble.

"But, in my opinion, this is a very healthy requirement, and compliance with it should be insisted on. A man naturally feels some pride in keeping a house, in which he is advertised as the owner, in a presentable condition. The name of the owner is often very difficult to obtain, and much time is wasted in consulting the various tenants, each one of whom generally refers to another as more likely to know than himself. Again, when an inspector learns from a tenant the name of the owner, and sends this to the Board in his complaint, how often it is found that the firm named is not the owner at all, and weeks often elapse before the real owner is discovered and receives the notice or order of the Board.

"The removal of garbage and refuse matters from these houses is carried on in the same unsatisfactory manner as last year. Since the destruction of the large garbage boxes which formerly stood upon the sidewalk, the garbage is placed in all sorts and sizes of receptacles, such as pans, boxes, barrels, etc., and these are placed near the curb-stones. These are frequently overturned by hungry dogs and goats, or by mischievous boys, and their contents lodged in the gutter, where they generally remain for a long time. In consequence of this the gutters in front of many of the tenement houses are constantly in a filthy condition. I cannot but believe that if the owner of each such house were required to provide a suitable iron garbage receptacle, with handles, and a tight cover, that the streets and gutters would be less dirty and disagreeable. Under the present faulty system of removing garbage, it seems to me this is the only way of remedying what is now a great evil and glaring nuisance in many parts of the city.

"There are very few basements unfit for habitation, and scarcely any cellars that are occupied as dwelling places in my District." * * * * *

Extract from Report of Sanitary Inspector Charles W. Packard, M. D., Eighth District, bounded north, by One Hundred and Tenth street; south, by Forty-second street; east, by Central Park and Sixth avenue; west, by North river.

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"The construction of tenement houses, as they existed before the enforcement of the law (passed May 14th, 1867), 'for the regulating of tenement and lodging houses,' showed an astonishing neglect of the elementary laws of health. This was specially observed in the deficient light and ventilation. Enough money would be expended in building the house, but it did not seem to enter into 'the plan' to afford not only sleeping rooms, but also the means for their lighting and ventilation; and so the bed rooms were made into cells that were never cheered by the light of day, and out of which the tainted air had no means of escape, excepting through the single door of entrance to the room. The result has been that thousands of our citizens and their families have been compelled to accept bad air as one of their conditions of life, and one from which they had no power to escape. Their means being limited, and the nature of their calling obliging them to live near the place of their daily labors, they have had no choice but to huddle closely together in the busiest and most crowded parts of the city. Every night they laid down in an atmosphere charged with animal impurities that surrounded them like a bath, entering their systems with every breath they drew, and saturating their frames with the peculiar 'tenement house air,' that is a poison none the less sure because it is slow; and the effects of which are all the more deplorable because so easily

prevented. By the simple process of putting hall windows into all such rooms, and a ventilator in the roof at the top of the hall, it has become possible for tenants to breath fresh air without going away from home to find it; and an amount of good has been accomplished by merely *ventilating* their houses that cannot be measured or expressed.

"The practical good accomplished by the Board of Health is nowhere better seen than in the correction of this and similar abuses that nothing but the strong arm of the law can reach.

"A very frequent cause of complaint has been found in the imperfectly drained condition of the back areas and rear yards. In very many of these there has been no provision whatever made for carrying off the surface drainage, or the rain water from the roof. As a result of this neglect, the surface drainage from the badly graded yard, added to the rain water which falls directly into the area, finds its way into the basement, when it either sinks into the ground, or stands in pools in the hall-way or even in the dwelling rooms. As this water disappears from sight soon after the storm is over, the owners of the house are apt to look upon its presence as a temporary inconvenience rather than as a constant source of danger to all in the house.

"Cess-pools and cisterns are sometimes found attached to the tenement houses in this district, although they are not so frequently met with here as in the older portions of the city. Almost all the houses have been built since the introduction of Croton water, which has rendered the employment of cisterns unnecessary, excepting in the localities that the Croton has not yet reached. The number of cess-pools is steadily diminishing, and they are not tolerated upon any premises that it is possible to connect with the sewer. Many of them are badly built; and even the best of them, after a few years, become dilapidated. In order to be anything but an offensive and dangerous nuisance, they need to be not only water tight, but air tight as well. Their ordinary contents are largely made up of the washings of animal and vegetable matter that readily decomposes and gives rise to exhalations that are highly detrimental to health. When the cess-pool is situated at some distance from the house, the poisonous gases become diluted so that their ill effects are not so readily observed. Often times, however, they are built directly under the back basement windows, and are then almost certain to deteriorate the health of all in the house, and to so depress their vital power as to render them easy victims to disease and death. Many an epidemic of fever has been traced directly to a neglected or imperfect cess-pool or drain. Wherever it has been practicable, these nuisances have been entirely done away with; but when this was impossible, the owner has been required to keep them disinfected and clean, and tightly covered.

"In the Eighth District alone, which is located up town, and where the houses are comparatively new, it is no exaggeration to say that almost every tenement house was found in a condition that violated some of the well understood and imperative laws of health. Sometimes this was the result of ignorance on the part of the owners, who perhaps feel that tenement houses must of necessity be a nuisance, such as they had always known them to be; and who considered the 'tenement house smell,' the dark and fetid bed rooms, the filthy walls and wet cellar, and the overflowing privy, as somehow inseparable from houses of this class, and in no way chargeable against themselves. If the tenants became clamorous and drove them so far as to think of improvements, they counted the cost, and reflected that after all their houses were no worse than their neighbors, and that they

would still have tenants, whose necessities would compel them to accept such accommodations.

"Under the operation of the new law all this has been changed, and it is a satisfaction to report that vast improvements have been effected—improvements that, in the aggregate, have benefitted hundred of families, by securing for them good hygienic surroundings, and thus not only improving their physical condition, but their self-respect and usefulness as well."

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For information regarding the plans for certain proposed new structures, especially a new public market and a number of public drinking fountains and public urinals, I would respectfully refer to the accompanying report of the Engineer of the Board.

Several Inspectors have, by authority of the Board, been temporarily detailed to especial duty in the rescue of drowning persons, and others in the investigation of the cattle disease, already alluded to. As these subjects, however, receive the attention of a special committee, I respectfully refer to their reports.

For information regarding the registry of births, deaths and marriages, I would refer to the report of Dr. E. Harris, in charge of that Department.

In the execution of the orders of the Board the same plan has been followed as obtained last year. The organization of the labor department into three subdivisions is still retained, viz: 1st. That of skilled labor. 2d. That of unskilled labor, not including scavenging. 3d. Scavenging.

Of the whole number of orders issued by the Board since November 1st, 1867, viz: eight thousand five hundred and ninety-one (8,591), exclusive of four hundred and twenty-six (426) final orders (which are but repetitions of original ones), the Sanitary Superintendent has been obliged to execute but five hundred and fifty-five (555); the remainder having been complied with by the property owners or other responsible parties upon whom they were served.

In the subdivision of skilled labor there have been executed one hundred and sixty-three (163) orders as follows:

No. of order.	Date of execution.	Promises.	Nature of work.	Expenses.
	1968.			
9	June	121 W. 54th st.	Filling cellar.	\$42 50
13	July	140 Suffolk st.	Repairing and cleaning water-closet.	20 55
14	July	518 to 526 W. 39th st.	Filling sunken lots.	38 55
16	July	156 Henry st.	Disinfecting, emptying, cleaning and filling privy vault.	46 75
18	July	N. E. cor. 11th st. and avenue B.	Constructing manure vlt.	89 12
21	May	112 W. 39th st.	Constructing privy vault.	74 97
21	July	849 2d ave.	Removing old drain.	17 25
22	July	114 W. 39th st.	Removing old drain.	73 42
24	August	146 W. 30th st.	Constructing new sewer, connected privy.	334 33
25	May	110 W. 39th st.	Constructing manure vlt.	74 26
24	August	103 Greene st.	Filling privy vault.	26 00
30	August	14 Clay st.	Cleaning cesspool.	3 00
32	September	356 W. 53d st.	Constructing sewer.	26 70
34	October	9th ave., bet. 63d and 64th streets.	Fixing drain, removing stagnant water, and filling sunken lots.	340 92
38	April	620 8th ave.	Constructing new sewer, connected privy.	275 50
41	April	122 W. 54th st.	Repairing privy vault.	8 17
42	May	422 3d ave.	Cleaning sewer.	19 15
44	April	469 7th ave.	Constructing privy vault.	105 76
48	May	435 W. 38th st.	Grading and paving yard.	130 50
53	July	N. S. of 77th st., 300 ft. E. of 2d ave.	Filling and grading lot.	107 90
54	July	N. S. 77th st., 400 ft. E. of 2d ave.	Filling and grading lots.	287 30
58	May	S. S. 58th st., E. of 1st ave.	Constructing sewer.	73 00
59	July	N. S. 77th st., 150 ft. E. of 2d ave.	Filling and grading lots.	284 00
61	June	82 and 84 Ludlow st.	Repairing chimney.	21 68
65	June	N. S. 76th st., 3d h. E. 1st ave.	Filling sunken lot and building drain.	100 50
68	July	143 and 144 West st.	Repairing leader.	46 52
75	June	14 Delancey st.	Flagging alley.	14 50
78	May	954 3d ave.	Constructing new sewer, connected privy.	303 60
79	July	89 Cliff st.	Constructing sewer, lining privy vault, and filling cistern.	266 45
81	August	147 E. 29th st.	Filling privy and cellar.	34 20
91	May	3 ave D.	Cleaning sewer.	57 50
83	August	W. S. 161st st., 150 ft. W. of 10th ave.	Constructing manure vlt.	71 94
85	May	507 and 509 W. 44th st.	Cleaning sewer.	9 00
86				
96	August	554 8th ave.	Connect'g premises with sewer.	603 50
97	July	554 8th ave.	Draining cellar.	131 58
100	August	440 7th ave.	Constructing sewer.	578 83
101	July	309 Broome st.	Constructing sewer, connecting waste pipes.	111 00
107	July	56 Marion st.	Constructing sewer, cleaning and lining privy vlt.	228 85
109	August	330 3d ave.	Constructing sewer, connected hydrant and leaders.	98 25
114	August	27 Jane st.	Constructing leader.	12 50
117	August	14 Abingdon square.	Construct'g water closet.	133 13
118	August	427 5th st.	Construct'g cesspool and grading yard.	50 00

No. of order.	Date of execution.	Premises.	Nature of work.	Expenses.
1868.				
121	August.....	256 Water st.....	Construct'g sewer, connected privy.....	\$177 16
124	August.....	145 E. 81st st.....	Constructing sewer.....	236 25
125	August.....	194 Madison st.....	Constructing sewer.....	43 50
131	August.....	115 E. 81st st.....	Connecting leader with drain.....	10 45
135	May.....	360 7th ave.....	Clean'g and lining privy vault.....	102 18
135	September.....	129 E. 50th st.....	Construct'g sewer, connected water-closet, cleaning and filling up privy-vault.....	424 88
136	June.....	25 Spring st.....	Repairing leaders.....	5 40
139	August.....	W. S. 6th ave., near 115th st.....	Filling cellar.....	16 00
144	August.....	109th st., about 80 feet east of 11th ave.....	Filling sunken lot.....	81 20
146	August.....	154 and 156 E. 35th st.....	Constructing manure vlt	74 02
148	August.....	S. S. 129th st., 4th b. W. of 5th ave.....	Construct'g sewer, connected privy.....	325 55
155	August.....	124 Crosby st.....	Construct'g sewer, cleaning privy-vault, connected with sewer.....	252 02
156	August.....	220 Varick st.....	Constructing sewer.....	124 25
157	September.....	449 4th ave.....	Constructing manure vlt	91 61
159	September.....	212 W. 35th st.....	Repairing wall of dyehouse.....	24 63
166	April.....	1,186 Broadway.....	Repairing water-closet and sewer pipe.....	42 26
166	September.....	100 ft. W. of 1st ave., N. S. 81st st.....	Filling sunken lot.....	10 00
169	September.....	E. S. Broadway, bet. 128th and 130th sts.....	Clean'g and lining privy	59 44
171	September.....	340 E. 28th st.....	Constructing manure vlt	97 88
173	September.....	385 3d ave.....	Construct'g sewer, connected privy.....	210 77
179	September.....	201 Broome st.....	Clean'g and lining privy	271 20
180	September.....	238 and 240 W. 41st st.....	Lining privy vault.....	120 65
186		439 11th ave.....	Connect'g premises with sewer.....	45 30
187	September.....	N. S. E. 50th st.....	Repairing drain.....	22 50
215	September.....	65 Park st.....	Repairing gutter.....	6 28
272	June.....	130 W. 20th st.....	Repairing sewer-pipe.....	8 60
358	April.....	641 W. 42d st.....	Construct'g sewer, connected privy.....	296 89
424	April.....	642 W. 42d st.....	Construct'g sewer, connected privy.....	287 71
425	April.....	643 W. 42d st.....	Construct'g sewer, connected privy.....	276 38
426	April.....	645 W. 42d st.....	Construct'g sewer, connected privy.....	276 38
427	April.....	N. S. Baltic st. bet. Broadway and Nevins st., Brooklyn.....	Connect'g premises with sewer.....	72 13
434	April.....	92 James st.....	Constructing sewer, connected privy.....	219 25
449	April.....	633 W. 42d st.....	Constructing sewer, connected privy.....	412 55
470	April.....	10 Doyer st.....	Repairing water closets.....	83 76
479	April.....	N. S. 118th st., bet. 1st ave. and ave A.....	Constructing sewer, connected privy.....	318 20
531	August.....	507 W. 26th st.....	Covering manure vault.....	8 23
644	May.....	51 Division st.....	Repairing pump, cleaning water-closet.....	9 50
654	May.....	109 Roosevelt st.....	Repairing leader.....	12 95
818	March.....	66 Crosby st.....	Cleaning water-closet.....	8 88

No. of order.	Date of execution.	Premises.	Nature of work.	Expenses.
1868.				
1,087	May.....	106 Eldridge st.....	Clean'g and lining privy	\$44 39
1,160	May.....	130 Columbia st.....	Cleaning sewer.....	8 00
1,222	June.....	118 E. 11th st.....	Repairing roof-gutter..	31 65
1,496	May.....	126 W. 54th st.....	Repairing sewer-pipe ..	5 00
1,523	April.....	20 Henry st.....	Repairing and cleaning water-closet.....	14 80
1,825	May.....	791 1st ave.....	Cleaning and repairing sewer.....	24 45
1,929	May.....	8 Baxter st.....	Cleaning sewer.....	8 75
2,227	June.....	21 Christopher st.....	Repairing waste-pipe..	3 50
2,239	April.....	N. W. cor. 74th st. and 2d ave.....	Filling sidewalk.....	74 00
2,504	June.....	139 Elizabeth st.....	Cleaning sewer.....	10 00
2,525	June.....	181 Prince st.....	Clean'g and lining privy	78 65
2,546	{ June.....	321 W. 43d st.....	Lining old privy.....	39 11
2,477				
2,552	June.....	89 3d ave.....	Repairing leader.....	22 80
2,632	July.....	431 W. 18th st.....	Repairing Canton pipe and cleaning drain....	8 43
2,757	July.....	124 Vandewater st.....	Cleaning drain-pipe....	13 00
2,846	July.....	53 ave D.....	Cleaning drain-pipe....	7 00
2,853	July.....	208 Chatham st.....	Repairing water-closet..	28 41
3,075	July.....	264 Spring st.....	Cleaning sewer.....	3 00
3,084	July.....	176 William st.....	Clean'g and lining privy	62 67
3,234	August.....	270 W. 42d st.....	Repairing sidewalk.....	45 75
3,242	August.....	590 8th ave.....	Cleaning sewer.....	9 00
3,244	July.....	52 Rutgers st.....	Clean'g and lining privy	101 02
3,246	August.....	117 Waverley pl.....	Repairing waste pipe..	66 04
3,255	August.....	405 E. 17th st.....	Clean'g sewer and waste-pipe.....	6 00
3,336	August.....	747 3d ave.....	Cleaning sewer.....	5 98
3,356a	August.....	749 3d ave.....	Cleaning sewer.....	5 48
3,378	August.....	43 Courtlandt st.....	Repairing water-closet..	30 45
3,391	August.....	3 Clark st.....	Lining old privy.....	148 85
3,392	July.....	45 Crosby st.....	Cleaning drain.....	20 43
3,426	July.....	566 7th ave.....	Clean'g and filling privy	\$29 50
3,437	August.....	158 Norfolk st.....	Cleaning and repairing privy.....	62 40
3,440	July.....	433 & 435 W. 39th st..	Cleaning sewer.....	6 00
3,472	August.....	239 E. 28th st.....	Cleaning sewer.....	18 75
3,482	August.....	17 Oliver st.....	Clean'g and lining privy	93 40
3,520	August.....	149 E. 38th st.....	Repairing waste pipe..	7 75
3,601	July.....	429 Washington st.....	Lining privy and cleaning sewer.....	145 34
3,604	August.....	414 W. 26th st.....	Lining privy and cleaning sewer.....	55 17
3,617	September.....	10 Lewis st.....	Clean'g and lining privy	85 73
3,621	August.....	169 William st.....	Clean'g and lining privy	99 73
3,657	August.....	379 E. 10th st.....	Cleaning and repairing sewer pipe.....	23 90
3,686	August.....	18 & 18½ ave. D.....	Clean'g and lining privy	38 85
3,717	August.....	452 3d ave.....	Repairing waste pipe ..	10 15
3,718	August.....	341 3d st.....	Clean'g and lining privy	44 30
3,829	August.....	647 5th st.....	Resetting gutter stones	4 87
3,830	August.....	619 5th st.....	Resetting gutter stones	4 87
3,871	August.....	167 Chrystie st.....	Clean'g and lining privy	84 70
3,877	September.....	370 Mulberry st.....	Clean'g and lining privy	90 42
3,880	August.....	64½ 9th ave.....	Lining privy and repairing sewer.....	68 22
3,890	August.....	56 W. Broadway.....	Lining privy and repairing sewer.....	108 75
4,001	August.....	143 ave. B.....	Removing obstructions in sewer pipe.....	4 00
4,005	September.....	347 E. 17th st.....	Lining privy.....	70 42
4,006	August.....	15 Eldridge st.....	Clean'g and lining privy	104 60
4,018	{ August.....	561 6th ave.....	Cleaning cellar, repairing stoop and leader..	69 11
4,024				
4,089	September.....	7 Monroe st.....	Cleaning sewer.....	13 00

No. of order.	Date of execution.	Premises.	Nature of work.	Expenses.
1868.				
4,096	September	272 7th ave.	Clean'g and lining privy	\$97 88
4,129	August	54 Laurens st.	Repairing soil pipe....	35 34
4,142	September	160 W. 52d st.	Clean'g and lining privy	122 90
4,163	September	16 W. 129th st.	Repairing leaders	30 20
4,166	August	340 W. 42d st.	Cleaning sewer	18 00
4,170	August	238 William st.	Cleaning sewer	17 75
4,182	August	203 & 203 1/2 Division st..	Cleaning sewer and waste pipe	15 00
4,200	August	23 9th ave	Clean'g and lining privy	99 15
4,201	August	25 9th ave	Clean'g and lining privy	80 12
4,205	October	21 Pell st.	Clean'g and lining privy	71 18
4,214	September	144 Varick st.	Clean'g and lining privy	142 38
4,353	September	549 3d ave	Cleaning and repairing sewer pipe.	16 00
4,413	October.	429 5th st.	Relaying gutter stones.	3 00
4,414	October	431 5th st.	Relaying gutter stones.	3 00
4,481	September	335 Front st.	Repairing sewer pipes..	8 73
4,487	September	52 Marion st.	Cleaning sewer	8 00
4,525	September	807 6th ave.	Clean'g and lining privy	94 25
4,533	September	107 Bleecker st.	Repairing soil pipe....	18 45
9,513	March	130 W. 30th st.	Repairing leaders	26 81
9,753	} March	{ 200 E. 21st st. & 245 } 3d ave	Cleaning and repairing sewer	49 32
9,754				
10,000	April	59 New Bowery	Clean'g and lining privy	76 32
10,978	May	80 Greene st.	Clean'g and lining privy	63 78
10,979	June	279 1st ave	Clean'g and lining privy	83 93
11,177	May	240 Mulberry st.	Clean'g and lining privy	88 00
Total				13,654 36

In the subdivision of unskilled labor, besides the scavenging, which has been under the supervision of the Captain of the Sanitary Company of Police, there have been executed fifty-one (51) orders, as follows:

No. of order.	Date of execution.	Premises.	Nature of work.	Expenses.
1868.				
179	May	28 Laurens st.	Cleaning yard	\$6 75
369	June	18 Cherry st.	Removing obstructions in soil pipe	2 50
518	May	631 2d avenue	Cleaning cellar	5 25
560	May	38 & 40 W. Broadway..	Whitewashing halls, etc.	13 00
563	June	11 Baxter st.	Removing obstructions in soil pipe	1 50
650	May	133 Greenwich st.	Whitewashing halls, etc.	16 08
675	May	329 E. 32d st.	Cleaning privy house	75
693	May	232 Mott st.	Cleaning privy house	75
740	May	273 & 275 W. 39th st.	Cleaning privy house	1 50
854	May	287 & 289 Broome st.	Cleaning privy house	75
1,113	June	78 9th ave. & 362 W. } 18th st	Remov'g obstructions in sewer pipe and repairing the same,	17 30
1,194	May	199 W. Houston st.	Remov'g obstructions in sewer pipe	7 50
1,242	May	12 Jersey st.	Cleaning privy house	75
1,306	May	269 Mulberry st.	Cleaning privy house	75
1,427	May	46 ave B.	Remov'g obstructions in sewer pipe	1 50
1,534	May	306 9th ave	Remov'g obstructions in sewer pipe	3 00
1,750	July	39 Hudson st.	Repairing wooden railing on roof of house	3 81

No. of order.	Date of execution.	Premises.	Nature of work.	Expenses.
	1868.			
1,931	June	105 Bayard st.	Remov'g obstructions in sewer pipe.....	\$1 50
2,494	July. . . .	608, 610 & 612 E. 15th st	Cleaning vacant lots.....	9 40
3,148	{ July.....	350 E. 33d st.....	Cleaning vacant lots.....	24 00
2,725			Cleaning alley	5 25
3,160	July.....	24 Minetta lane.	Repairing floor and seats of privy house.....	3 25
3,309	July.....	144 Leonard st.....	Clean'g and disinfecting cellar	12 60
3,413	July.....	1414 Broadway.....	Repairing waste pipes.....	5 50
3,640	August....	338 E. 14th st.....	Cleaning area.....	10 40
3,650	August....	75 Nassau st.....	Cleaning court-yard.....	6 00
3,780	August....	35 & 37 Bey st.....	Cleaning and disinfecting yard and privy house.....	6 50
3,919	August....	634 Broadway.....	Cleaning yard and wooden cages.....	15 90
3,986	August....	62 Bayard st.....	Cleaning and disinfecting yard and cellar.....	43 75
3,988	August....	314 E. 49th st.....	Repairing hydrant.....	9 45
4,011	August....	187 Laurens st.....	Cleaning yard.....	9 00
4,012	August....	57 Maiden lane.....	Disinfecting privy vault.....	7 05
4,084	August....	6 Jersey st.....	Disinfecting privy vault.....	3 05
4,085	August....	8 Jersey st.....	Disinfecting privy vault.....	2 57
4,097	August....	2 & 4 Stuyvesant st. .	Clean'g and disinfecting cellar	41 95
4,118	{ September	{ E. 46th st., 1st b. E. of 2d ave., N. S.....	Disinfecting privy vault.....	2 57
4,371			Disinfecting privy vault.....	2 72
4,140	August....	323 W. 17th st. . . .	Cleaning and disinfecting sub-cellar.....	22 29
4,280	August....	443 Pearl st.....	Repairing roof leader.....	8 00
4,300	August....	600 Broadway.....	Cleaning and disinfecting vacant lots.....	5 50
4,389	September.	335 W. 44th st.....	Clean'g and disinfecting cellar	8 95
4,510	September.	436 & 438 W. 41st st. .	Repairing Croton water supply pipe.....	10 10
4,611	September.	444 W. 28th st.....	Cleaning hydrant drain.....	1 50
10,998	April.....	187 Laurens.....	Removing obstructions from gutter and repairing the same	11 25
11,119	April.....	191 Mulberry st.	Cleaning and removing obstructions in cesspool-drain..	4 50
11,155	March....	645 Broadway.....	Cleaning yard and hydrant drain.....	14 50
11,168	April.....	270 8th ave.	Cleaning yard.....	3 00
11,308	March....	541 6th ave.	Remov'g obstructions in sewer pipe.....	1 50
11,399	April.....	233 Church st.	Repairing sewer pipe.....	2 75
11,426	April.....	34 Park st.....		
11,459	April.....	321 E. 20th st.....		
Total.....				\$400 82

In consequence of the active enforcement of the Tenement House Law, the number of orders to be executed has very much diminished; the present course being for the Inspectors to report violations of said law, and the Board to prosecute for penalty.

Beside the work done in the execution of specified orders of the Board, the Disinfectant Department has, in compliance with instructions of the Board, and in continuation of the plan of last year, employed during the hot weather, a number of men, horses and carts in the extra cleaning of streets and gutters in the filthier portions of the city. The expenses thus incurred have been paid by the Comptroller.

In conjunction with this extra cleaning of streets and washing of gutters, lime, chloride of lime, and in the sewers and other appropriate places after the same had been washed down by use of the hydrants, carbolic acid and sulphate of iron have been freely used.

The general plan has not been altered from that sanctioned by the Board in 1866, and which has been in use over a greater or less extent since that time, and is as follows: A certain number of carts pass through the streets, and all filth or other obstructions are removed from the gutters, as well as any especial accumulation of offensive material upon the pavement. The gutters are then thoroughly washed, by means of the hydrants, and disinfected by the articles mentioned above, which are drawn in carts following those used for the gathering and removal of the filth. Disinfection has been applied, too, in filthy yards and outbuildings.

During the month of July, in accordance with the advice of the "Special Committee on Disinfectants," an experiment was tried of sprinkling certain streets in those districts of the city where the mortality was greatest, with a mixture of carbolic acid (redistilled heavy oil), sulphate of iron in solution and water, by means of ordinary sprinkling carts. Owing to the crowded state of the streets the experiment was conducted during the hours of the night and on Sunday. Practically this experiment was not a success. The labor required in the preparation and distribution of the material, the damaging effects of the contact of the latter with the sprinkling machines and other appliances used, the clothing of the employees, and the paint upon such articles as it might reach, made it expensive, while the beneficial results were quite temporary, owing to the rapid evaporation of the solution, and the constant renewal in the gutters and upon the surface of the streets of the garbage and other offensive material. It was also found necessary to use disinfectants freely, in many instances, about the bodies of those dying from sunstroke, and in several it was thought expedient to also remove the bodies to the Morgue.

The men and horses of this Department were also used, on several occasions, in the transportation of apparatus for the rescue of drowning persons.

As usual, however, the Disinfectant Department has chiefly been employed in executing the orders of the Board upon premises where nuisances were reported, requiring for their abatement only unskilled labor, in the prompt removal of foul accumulations, accidental or otherwise, when action

could not properly await the routine process of order, and in the disinfection of tenement or other houses where diseases of a contagious character, or suspected to be such, have occurred. In the majority of cases the free use of disinfectants upon the surface and in the privies, cess-pools and other similar receptacles, has been sufficient, while in a number the precaution of thorough fumigation with sulphurous acid gas or chlorine has been resorted to. The action has been effectual.

I would mention in passing that the services of this Department in combating infection, or suspected infection, has been solicited on several occasions by public institutions and by private citizens. These requests, requiring but trifling outlay, and being manifestly for the public good, have always been acceded to. The good results of this gratuitous service have been gratefully acknowledged.

The Department continues under the efficient management of Mr. James A. Christie, who has held the position since the organization of the Department in 1866.

The property now on hand is as follows :

Horses	4
Wagons (light)	2
Carts	3
Truck (unservicable)	1
Harness, heavy (double)	1
Harness, heavy (single)	3
Harness, light (single)	2

Disinfectants—

Carbolic Acid	(galls. 41), bbl. 1
Coal Tar	(galls. 20), bbl. 1
Redistilled heavy oil	(galls. 41), bbl. 1
Sulphate of Iron	lbs. 200

Tools—

Shovels, hoes, brooms, etc. (as per inventory).

Hospital Property—

Bedsteads, bedding, office, kitchen and table furniture (as per inventory).

Returns of all labor performed in the subdivision of skilled labor, giving details of men employed, materials expended and the expenses attaching to each job, have been rendered every month, while similar returns of unskilled labor and of scavenging have been laid before the Board every week.

In regard to the manner in which the work has been performed under this organization, there has been no complaint on the part of citizens. Occasional differences as to the propriety of the charges have been readily settled.

Very respectfully, your obedient servant,

EDWARD B. DALTON,

Sanitary Superintendent,

Metropolitan Sanitary District.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent* :

Sir—In obedience to your instructions, contained in Circular No. 23, requiring a statement of the changes and improvements made during the past year in the First Sanitary District, I would respectfully present the following

REPORT:

The First Sanitary District includes the entire Fourteenth, Sixth, Fourth and Second wards of the city of New York, and more than two-thirds of the First ward. The lower portion of this District, comprising the First and Second wards, differs very materially from the rest. The resident population has been constantly decreasing within the last few years, until, at the last Census, the number of inhabitants in the First ward was only 9,852, and in the Second ward, 1,194. The buildings consist of stores and warehouses and a few tenement houses, which were formerly occupied as the residences of private families. The improvement in the sanitary condition of these wards has been confined, for the most part, to these stores and warehouses, and relates chiefly to drainage. The old privy vaults have been abandoned, and water closets, with properly trapped connections, have been substituted to a very great extent.

The cellars in the streets in the vicinity of the river, where the ground is either naturally depressed or artificially formed, have been greatly improved by direct drainage, or the exclusion of dampness and water by a proper flooring of cement. The lower section of this part of the District enjoyed considerable advantages of sewerage, which have been increased by new constructions during the present year. The streets have been extensively repaved; the old cobble-stone pavement, with difficulty kept free from accumulated filth, has given place to the Belgian, Nicholson and other forms. With the new pavements, the street gutters have, also, in connection with them, undergone a corresponding improvement.

PIERS.

Little, if any, change for the better is observable in the condition either of the public or private piers, and well founded complaints continue from time to time to be made in regard to their neglected and unsafe state. This is in part owing to a general expectation that both these kind of piers may be placed by the Legislature of the State under the management of an incorporated organization, and be entirely superseded by new and improved forms of docks.

MARKETS.

The Fulton Market presents all the objectionable features, in regard to a neglected sanitary state, which have been heretofore noticed. This market is built upon made ground, with insufficient sewerage. It is also badly ventilated. While the occupants, both of the Market proper and of the wooden stalls and shanties around it, exhibit a desire to present their commodities in as favorable a light as possible, nothing has been done to remedy the inherent original defects of the structure and location.

The upper part of the First Sanitary District comprises the Fourth, Sixth and Fourteenth wards, and part of the Fifteenth ward.

There are in this part of the First Sanitary District about 2,000 tenement houses, these being about equally divided among the several wards. There have been very

few new ones erected within the year. The tenement houses in this District being for the most part old structures, which were erected before those of a better class in other parts of the city arose, are not so susceptible of improvement, or of the changes for light and ventilation required for their sanitary improvement, or by the provisions of the "Tenement House Act." As a consequence some of these improvements cannot reasonably be looked for until the houses themselves shall have given place to other structures. The widening and extension of Chambers street, some time since, was a step in this direction. The widening of Worth and Park streets also, which has been determined upon, will necessitate the removal of some of the worst of these old tenements in the First Sanitary District. It is proposed to carry Worth street through to Mott street, widening Park street, and taking parts of Mulberry, Mott and Baxter streets. This part of the Sixth ward contains a crowded, abandoned population, where all sanitary regulations are with difficulty enforced.

DRAINAGE AND SEWERAGE.

The District is, as a general thing, very well provided with street sewers, and increased attention has been given to their junction and slope. In a part of Cherry street, and throughout Rose street, new sewers have been recently constructed. The different tenement houses in these streets, throughout the entire length, have had, for the most part, sewer connections made, thereby furnishing facilities for house drainage of which they had formerly been deprived. In many cases the action of the Board was needed for this improvement, but, in others, it was voluntarily undertaken. Throughout the entire District sewer connections have multiplied during the year. Much difficulty, however, has been experienced in many cases of faulty construction. The owners of property, aiming rather at economy than thoroughness, when orders have been issued by the Board to connect the premises with the street sewer, have complied with the letter but not the spirit of the law, simply connecting the old privy vault by a six inch pipe, and neglecting a proper alteration as to construction, water supply, &c. Frequent complaints consequently arise from this cause. Indeed, in a majority of cases, the attention of the Sanitary Police is directed, not so much to the absence of sewer connections, as to the obstructions in them. Some improvement in this respect has been made in several large tenement houses, by adopting the plan of water closets used in the public school edifices. Very many cess-pools during the year have been filled up.

VENTILATION.

The beneficial results of the passage, by the Legislature, of the "Tenement House Act," are especially seen in the improvement in the ventilation of the sleeping-rooms of the tenement houses in this Sanitary District. The second section of this Act requires that every room which is occupied as a sleeping-room, and which does not communicate directly with the external air, must have a ventilating or transom window over the door leading into the adjoining room, and also leading into the hall. This form of ventilation has been enforced, and now very generally prevails throughout the District. Yet, here and there the unwillingness of the tenants to accept a sanitary good, even when provided for them, has been manifested.

The Board directed, last winter, that these ventilating windows be made in the dark bed-rooms of eight large tenement houses in Mott street; the owner, when notified, having complied with the order, and the windows being cut and communicating with the hall. Some little time after the tenants themselves boarded these windows up, preventing any means of ventilation whatever, and preferring a foul to

a pure atmosphere. Another mode of ventilation has been adopted. We refer to the ventilation secured by the construction of a ventilator in the roof of tenement houses at the top of the hall. Many of these houses have been thus altered, and the number of alterations are constantly increasing.

ASHES, GARBAGE AND RUBBISH.

The abatement of the nuisance arising from the neglect of the more prompt removal of ashes, garbage and rubbish, is still demanded. The barrels, boxes, etc., which contain this refuse, are often left exposed, upon the sidewalk, until they are broken and their contents scattered.

Inasmuch as the present contract system has proved insufficient and inadequate to accomplish what is desirable in this connection, some other mode must be adopted. But, in justice to the present contractor, it ought to be observed that a marked improvement has taken place during the last year over those which preceded it.

PUBLIC SCHOOLS.

The examination of the Public Schools, instituted by the Board some time since for the purpose of ascertaining the number of pupils who were unvaccinated, and of remedying any neglect in this respect as speedily as possible, was, as is well known, interrupted, and all the advantages to be derived by the pupils, and the community at large, from a thorough sanitary examination of this character, was not realized.

A single reference to the case of London, in the year 1860, when the Small-pox prevailed, epidemically, during the earlier months of that year, best illustrates these advantages.

For the purpose of a general vaccination, the examination of all young persons was determined upon, and the following is an extract from the official Report of the Privy Council.

"Forty thousand children were examined in a very short space of time. Infected localities were visited by the health officers (house to house inspection), and every adult and child were examined as to their protection." The result of this labor will best appear in the following figures. The deaths by Small-pox at the patients houses were, in January, 129; February, 136; March, 144; but in April and May, when the preventive measures might be fairly expected to tell, the deaths were but 78 and 57, and occurring among the unvaccinated.

The Small-pox, which has proved such a scourge in other West India Islands, has never prevailed as an epidemic in the little Danish island of Santa Cruz, since its authorities adopted the regulation which requires that every child, before entering a public school, shall present a certificate of vaccination from the King's physician, as he is termed.

In none of our public edifices is the neglect of proper and systematic ventilation attended with more pernicious results than in our Public Schools. This will at once be perceived when we consider the number and the ages of those who attend them, and the many consecutive hours passed by the pupils in a pure or vitiated atmosphere, according to the attention bestowed upon this important subject by teachers and officers. This very attention, bestowed by intelligent teachers, to provide at different times of the day the due admission and regulation of external air, is itself a valuable lesson, which is not lost on the susceptible mind of the young, and is in turn often transferred from the school to the dwelling.

As the result of the inspections of the Public Schools in this District, heretofore made, a very marked improvement, both in respect to crowding and ventilation, is observable.

YARDS, HALLS, ALLEYS AND AREAS

Very gratifying changes are noticeable in the condition of the halls, stairs, alleys and yards of the numerous tenement houses. Increased attention is paid to keeping them in a cleanly state. In consequence of the vigorous enforcement of the Sanitary measures in regard to these parts of the dwelling, housekeepers have been selected from the more intelligent tenants, who exercise general supervision of the premises, and require from the occupants an increased observance of cleanliness in the yards and stairways. Complaints in relation to the violation of such cleanliness, or for the removal of filth and refuse, have thereby become diminished.

BASEMENTS AND CELLARS.

The cellars in this District which are the most objectionable, are found chiefly in Cherry, Oak and Water streets. Some of these cellars (few, however, in number), which were entirely below the ground, damp and incapable of being ventilated, were closed by order of the Board, and are no longer allowed to be used as human habitations. Previous to this action of the Board, it became my duty to inspect cases of typhus fever in these cellars, and from the utter impossibility of obtaining adequate light and air, the infection spread rapidly among the occupants. Nothing was left to prevent its diffusion in the vicinity but the removal of the patients to the hospital, and the closing of the cellars. In most of the cellars, which are still occupied, a very marked improvement is perceptible. Stagnant water has been drained, and a better ventilation has been secured. The same difficulty, however, in the application of the Tenement House Act to these parts of tenement houses still prevails. Alterations are made with reluctance owing to the expense involved, and the law has been indulgently administered. The cellars situated in the Fourth ward, to which we have referred, are occupied almost exclusively as lodging houses. Often from fifteen to twenty lodgers are found in a single cellar. In the Sixth ward the cellars are used for the same purposes, but are more generally occupied by two or more families. But the cellar population, not only in this ward but in the other wards of this Sanitary District, has decreased and is decreasing. In Park street some very objectionable cellars were closed by order of the Board, being under ground and continually damp and wet from want of drainage. More strict and general observance in having the walls lime-washed, in such of these abodes as are occupied, is noticeable; and, when unoccupied, filth and refuse are not allowed to accumulate in them as heretofore.

The improvement in the condition of the District, to which the duties of the undersigned are limited, is such as might have been anticipated from the Sanitary measures of the Board, and every reasonable expectation has been fulfilled. The enforcement of these measures conflicts with the ignorance, the prejudice and the habits of the poor, and sometimes with the imaginary interests of the rich. From the very necessity of the case, all sanitary reforms are made with difficulty, and time is required to demonstrate their value. The great plague of London, in the year 1665, was an unparalleled pestilence, sweeping off 100,000 persons, nor was it stayed until the great fire of the succeeding year had entirely destroyed the close, ill-ventilated, miserable habitations in which it had its lodgement. Heaven itself seems to have intervened to relieve the wretched inhabitants from further destruction from the infection, and, at the same time, to suggest the sanitary measures neces-

sary to prevent its recurrence. But so little was learned from the event that houses soon arose in the same locality after the same type. Narrow streets, and narrower alleys, and blind courts again interrupted the free admission of light and air. As a consequence, typhus and kindred disorders found there a congenial home. The ravages of the cholera in this locality rivalled the ravages of the plague, and two centuries were required to teach men "better methods than a general conflagration for remedying such evils."

Respectfully submitted,

A. W. MACLAY, M. D.,
Sanitary Inspector.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent :*

Sir—I have the honor to submit my annual Report upon the sanitary condition of that portion of the city known as the Second Sanitary Inspection District, and bounded as follows :

Commencing at Pier No. 1, North river, proceeding up Battery Place to Broadway, up Broadway to Canal street, through Canal street westward to North river, and including a part of the First, and the whole of the Third and Fifth wards.

In this district there are about five hundred tenement houses, containing in the aggregate about four thousand families, and at an average about six persons to each family, making the tenement house population about twenty-four thousand.

Nearly all of the present tenement houses were originally built either for storage or private dwellings. Those built for storage houses were altered in the cheapest possible manner, so as to contain a large number of families seeking such quarters on account of the cheapness of the rent.

In the alteration of these buildings, the comfort, convenience and healthfulness of the numerous families occupying these apartments was not thought of, consequently the bed-rooms and hall-ways throughout were void of light and ventilation; the stairs were narrow, and, in many instances, really dangerous to ascend or descend, especially at times of any unusual excitement. The privy-vaults in the yards were often found full and overflowing. The scent arising from their decomposing contents was truly detrimental to health, and, in my opinion, one great cause for the prevalence of zymotic diseases that often prevailed in such localities.

A law was passed, May 14th, 1867, for the regulation of tenement and lodging houses in the cities of New York and Brooklyn.

Prior to the passage of this Act, about one hundred cellars were occupied as dwelling and lodging places, being located, principally, in Greenwich street, Washington street and West Broadway. Many of them were damp, dark and gloomy abodes, having no communication with the external air or light, except from the entrance door.

The Tenement House Law provides for the general improvement of all cellars used for human habitation, especially as regards their ventilation and drainage.

On account of the stringency of this law in compelling the owners to make all necessary alterations, about one-third of the cellars have been closed up or rented for mechanical purposes. The Board of Health has granted, during the past year, fifty-three permits for the occupancy of certain cellars in this District as dwelling and lodging-houses.

When I first entered upon the duties of Sanitary Inspector of the Second District I was surprised to see how little attention owners of tenement property had paid to the subject of drainage. In the rear of a large house I would find a cess-

pool or cistern located in the yard, and made the receptacle for all the waste water from the house and its surroundings. The privy-vault, located in one corner of the yard, was often found overflowing. Sometimes the privy-vault and cistern were connected together, and their contents formed such a compound of stagnant filth, that, in my opinion, this was one of the greatest causes producing cholera in these localities during the summer of 1866.

A great change has taken place in the sanitary condition of tenement house property since that summer. Cisterns and cesspools have been done away with, and the premises have been connected with the street sewer. Nearly all the old and filthy privy-vaults have been emptied, disinfected and connected with the street sewer.

In all the modern built tenement houses owners have voluntarily introduced regular water-closets, with all the apparatus for flushing, etc.

The condition of the gutters in some streets, and particularly those in West, Greenwich and Washington streets, is still defective. These gutters are so level that the waste and surface water cannot, of its own gravity, find its way into the sewer culverts, and consequently becomes incorporated with ashes and garbage, to such an extent that it can be removed only by the aid of the shovel and hoe. The only remedy in this case is to cause the Croton hydrants to flood these gutters once or twice every twenty-four hours. Without some such action these streets are always more or less filthy from accumulations of garbage.

During the summers of 1867 and 1868 the dumping ground at the foot of Vesey street has been frequently complained of by citizens who pass that part of the city. The offensive odor, emanating from an accumulation of sixteen thousand loads of street manure, was a sufficient cause for such complaints.

Owing to some misunderstanding or technicality in the wording of the contract for the removal of the street manure from the bulkhead on this pier, this mass remained longer than it should. It has, however, lately been carted away, and the ground upon which it was piled has been thoroughly disinfected.

In conclusion, I am pleased to say that the general sanitary condition of my District has much improved since the organization of the Board of Health, and particularly since the passage of the Tenement House Law. This law, instead of being odious, is regarded with satisfaction, not only by tenants, but by owners and agents of tenement property. Orders or suggestions emanating from the Board of Health are now promptly attended to within the prescribed time of five or ten days, as the case may be.

Respectfully submitted.

W. F. DEMING, M. D.,
Sanitary Inspector.

New York, October 31st, 1868

E. B. DALTON, M. D., *Sanitary Superintendent :*

Sir—I beg respectfully to submit the following report upon the general condition and the changes and improvements of the Third District during the past year.

The District comprises that part of the city lying between East Fourteenth street on the north, Catharine street and East river on the south, Third avenue and the Bowery on the west, and Avenue A, Norfolk and Jefferson streets on the east. It includes one of the most densely populated and thickly built-up portions of the city.

In accordance with instructions, the following subjects are referred to in detail as illustrating the improvements effected and the progress of sanitary reform.

The enforcement of the Code of Health Ordinances, and the Tenement House Act, has produced a marked improvement in the condition of the areas, alleys and yards. By the removal of surface drains from alley-ways, where sewer connections exist or have been established, one of the principal causes of damp cellars and filthy street-gutters has been abolished.

Accumulations of garbage and rubbish are now very seldom found, except in the vacant spaces between rear tenement houses, which still, in many cases, continue to be favorite repositories of slops and filth.

There has been no change in the system of removing ashes and garbage. Occupants of building are still obliged to deliver it in the streets, which are, in consequence, encumbered with numerous and overflowing boxes and pans. A great reform has taken place in the condition of basements and cellars, owing principally to the effective working of the Tenement House Act.

The use of cellars for sleeping purposes has been discontinued to a great extent. In a few instances special permits have been granted upon the recommendation of the Inspector.

Damp cellars, except from accidental causes, are now but seldom the subjects of complaint. All of the bone, offal and fat-boiling establishments have been removed from the district.

No new cess-pools or cisterns have been constructed in the District, while very many old ones have been cleaned, disinfected and filled in with earth or ashes.

The business of keeping cows has been discontinued, except in a few cases where a special permit has been granted.

The street gutters have been kept tolerably clean during the past year, and especially during the summer months.

This has been owing partly to the greater care and thoroughness shown by the street contractor in his method of removing ashes and garbage, and partly to the frequent cleansing and disinfecting of the gutters by the Disinfectant Department of the Board.

Depressions of the curb and gutter-stones, by allowing the accumulation of waste water and filth in the gutters, afford a constant subject of complaint, though in every instance where complaint has been made the condition of the gutters has been remedied.

The results of the enforcement of the provisions of the Tenement House Act are very marked, and such as to fully justify the hopes of its authors.

The number of tenement houses within the limits of the Third District is about three thousand three hundred and fifty; nearly sixteen hundred of these houses were in a bad sanitary condition.

During the past year six hundred have been reported as being in violation of the law, and have been altered so as to conform to its provisions. Very many of the remaining houses have been altered voluntarily by their owners, the requirements of the law being now fully understood.

The improvements effected have been mainly those required by the second, third, fourth, fifth, seventh and ninth sections of the act, and consist of more efficient ventilation of hall-ways and sleeping-rooms; additional means of escape in case of fire; the repairing of leaky roofs and defective leaders; the construction of sewer connections, and a more thorough drainage of alley-ways, areas, cellars and yards; the removal of the cellar population, and greater cleanliness, with more frequent whitewashing. Impracticability is no longer urged as an objection to any of the sections of the law.

There is no doubt that the regard shown by landlords in providing for the health and comfort of their tenants reacts upon the tenants themselves, and arouses a spirit of emulation and a willingness to maintain their portion of the premises in a good sanitary condition.

The beneficial working of the Tenement House Act is quickly noticed in the outward appearance of tenement premises, especially in the improved condition of the hydrants, house-gutters and leaders.

It is to be hoped that the plan of connecting the front leaders with the house sewers may be universally adopted, and thus the sidewalk surface drains be removed.

There are no lime or shell burning establishments within the District. The two public markets in the District are small, clean, and well kept.

No large accumulations of manure have been permitted in the District during the past year. Stablemen are usually prompt in causing its removal. The manure vaults are generally in a good condition. A large number of stables have been drained and connected with the sewers.

There has been no improvement in the condition of the piers. Many of the bulkheads, which extend from pier to pier, are in a condition dangerous to life from the fact that the streets have become gradually filled in, so that their surfaces are on a level with the bulkheads. Thus no protection against accidents is afforded.

The number of filthy and overflowing privies has greatly decreased, owing in part to the increased number of sewer connections which have been established, and in part to the constant inspection of the Sanitary Police.

The premises occupied by rag-pickers and rag-dealers have been frequently inspected, without, however, finding any cause for complaint.

Several new sewers have been laid during the past year, and most of the streets are now provided with sewerage facilities. The sewerage of that portion of the District bordering upon the river is still defective, and gives rise to frequent complaints. The action of the tides often occasions wet cellars, and causes the contents of the privy-vaults to overflow.

Owing to frequent inspection the slaughter-houses have been kept in a cleaner condition than ever before. The proposed removal of such establishments will alone remedy the numerous evils attendant upon the present method of conducting the business in the built-up portions of the city.

The streets have presented a better appearance than during the preceding year. In the early spring there was considerable and unnecessary delay in removing the accumulations of garbage and ashes which had collected during the winter.

Under the imperfections of the present system of street cleaning, no decided sanitary improvement can be expected.

All swine have been removed from the District. The few vacant lots in the District are in a tolerably cleanly condition.

Very respectfully,

THOMAS H. WHITE, M. D.,
Sanitary Inspector.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent :*

Sir - I beg leave respectfully to submit the following report of the principal changes and improvements that have been effected in the Fourth Sanitary District, bounded north, by Fourteenth street ; south, by Canal street ; east, by Broadway ; west, by North river, during the past year. For convenience of description and

reference, they are classified under separate headings, which, it is believed, include the chief subjects to which special attention has been given.

Since the passage and enforcement of the Tenement House Law, the condition of areas has become a subject of special attention and importance, particularly with reference to the occupancy of cellars and basements. The number of persons dwelling in low, damp and ill-ventilated basements has been so great, and the supply of dwellings for the class of people occupying them so inadequate, that in the absence of any special law bearing upon the subject, it was often found more expedient to leave the occupants undisturbed than by summarily closing such cellars, to eject a large population for whom no accommodation could be provided. Now, however, a reform in this respect is gradually developing itself, and it is not too much to say that while the worst evils of "cellar life" are already abolished, the less conspicuous ones are rapidly disappearing. The provisions of the Tenement House Act requiring that the areas of all cellars occupied as dwellings should be of a specified depth and width, and thoroughly drained, have already been enforced in a considerable number of houses in my District, and have converted basements previously damp and ill-ventilated into habitations comparatively light, airy and comfortable.

The establishment of sewer connections in all tenement houses, and in most private dwellings, has now become so general that very many of the causes of complaint respecting alleys and yards have been abolished, and the pools of stagnant and filthy water that were formerly so commonly met with, are now of infrequent occurrence. There is also a marked diminution in the number of complaints of yards and alleys filthy from accumulations of refuse matters.

The best method of collecting ashes and garbage is a subject that has occupied a great deal of attention on the part of the Sanitary Inspectors and of the Board of Health, but for reasons equally beyond the control of either, no special improvement has been effected. In the Fourth District, however, the collection of ashes and garbage has given rise to very few grounds of complaint.

As has been already stated, the condition of many occupied basements has been greatly improved by a rigid enforcement of the provisions of the Tenement House Law. And many others have been vacated and used for other purposes. Nearly all that are now used as dwellings are occupied by a special permit from the Board of Health, which is only granted on the recommendation of the Sanitary Inspector, after a careful inspection of the premises.

The number of cess-pools and cisterns in the District has been greatly diminished during the past year, partly in consequence of the introduction of sewer connections, and in part from the filling up of old cisterns that have long fallen into disuse.

Collections of filthy and stagnant water in the street gutters, due to improper grading or to depressions from other causes, are of very frequent occurrence. In some cases the evil is one easily remedied, but in many others, especially where there exists a series of such depressions extending over a considerable space, and requiring the regrading of the whole, or the greater part of the block, it is almost impossible to obtain such a co-operation of all the different owners of the lots as will secure a uniform and proper grading.

While a great deal of time has necessarily been spent in the investigation of complaints of particular nuisances reported by citizens and others, the one special work to which attention has been given during the past year, has been the inspection and improvement of tenement houses. The vast amount that has been accomplished in this direction can only be appreciated by those familiar with the details; and although there yet remains much to be done which we know to be practicable, and

much more must be left undone because it is impracticable, yet enough has been effected to show the practical working of the Tenement House Law. The thousands of windows that have been cut into dark and ill-ventilated bed-rooms; the whitened walls and ceilings of the public halls and stairways; the improved drainage of kitchen sinks, water-closets and privies; the fresher air circulating in the halls from the ventilators in the roofs; the improvement in the condition of so large a number of occupied cellars; the greater facilities for escape in case of fire, all bear witness to the wisdom which led to the enactment of the Tenement House Law, and to the efficiency with which it is now being enforced.

In no other department of sanitary reform has so much been accomplished, of permanent value, as in this.

Nuisances, due to broken and imperfect hydrants, decayed house-gutters, and broken or obstructed leaders, are of constant occurrence, more especially in the winter season, and are not generally preventable. The inconvenience they occasion, however, is generally of such a nature as to compel attention, and they are generally promptly abated.

There are two markets in this District, one at the foot of Spring street, known as Clinton Market, and the other at the corner of Sixth and Greenwich avenues, known as Jefferson Market. They are both generally well kept, and I have never had occasion to make a complaint of either of them.

The number of complaints due to the accumulations of manure, absence of manure pits, and badly kept stables, has greatly fallen off during the past year, and the general condition of the stables in this District is much better now than formerly.

The general condition of the piers along the river front, from Canal street to W. Fourteenth street, has undergone no considerable change during the year. Several broken wharves have been repaired, and a few have been cleaned, but in general the provisions of the street cleaning contract referring to piers are not complied with.

The condition of privies still continues to claim a large share of the attention of the Inspector, but by no means to the same extent as at first. So many have been abolished and replaced by water-closets, and so many others connected with sewers, that the number of complaints due to this cause has fallen off probably one-half.

Although the Fourth District includes some of the oldest wards in the city, there are still several streets and parts of streets that have no sewer. In every case where such deficiency exists, complaint has been made of it, but in nearly every instance without effect.

Notwithstanding the issue of peremptory orders on the part of the Board of Health, for the discontinuance of slaughtering in this District, the business is still carried on in all the slaughter-houses precisely as before, no change in this respect having taken place during the past year.

The general condition of the streets with respect to cleanliness has been unusually good for several months past, and still continues to be so.

There are no ponds in this District, and no vacant lots except the newly made grounds along the river front. They have given no occasion for complaint.

In conclusion, I would remark that the readiness with which the orders of the Board for the suppression of nuisances are now complied with, is one of the most striking evidences of the great improvement that has been effected in our sanitary system, and contrasts strongly with the apathy, not to say opposition, with which they were formerly received. It is owing, in no small degree, to this cause that so much in the way of permanent improvement has been effected during the past year.

JAMES L. BROWN, M. D.,
Sanitary Inspector.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent:*

Sir—In compliance with Circular No. 23 from your office, I have the honor to submit the following report upon the general sanitary condition of the Fifth District, for that portion of the past year during which it has been in my charge.

This district, extending (below Fourteenth street) from Avenue A, Norfolk and Jefferson streets to the East River, is composed very largely of tenement houses, of which the Eleventh ward is believed to contain a far larger number than any ward in the city. The class of population occupying the northern portion of this tenement section is of the most destitute character, while the lower and southern part, occupied chiefly by Germans of the middle class, is far cleaner and in better hygienic condition.

Below Houston street, which divides the District into two nearly equal parts, the streets are much less uniform in character; several, which are so cleanly and well kept as seldom to need a visit from the Inspector, closely adjoin others, the filthy and offensive condition of which defies all efforts at improvement. As directed by your circular, however, I proceeded to note briefly the condition of the various subjects specified.

A slight improvement is noticeable in the condition of the areas and alleys, although not nearly so great as could be desired. The tenancy is still constant to allow garbage and rubbish to collect in the areas, many of which are also imperfectly drained, while the alley-ways are sources of frequent complaint from the overflow of waste water. The yards show much more improvement, many having been paved and graded during the past summer, and nearly all being kept cleaner than formerly.

Although less garbage and rubbish are found in the yards and cellars of houses, the method of their disposal and removal is still as unsatisfactory as ever. As an universal rule, the more careless class of tenants are indifferent whether their ash-boxes stand all day on the pavement or be emptied into the gutter. With garbage still more difficulty arises, from the failure of the attempt to institute permanent garbage-boxes, which has left the people more indifferent than before as to its disposition. The Superintendent is, however, well aware that this question is beyond the present jurisdiction of the Board, and that the Inspectors are consequently powerless to remedy the difficulty.

The condition of such basements and cellars as are occupied by families shows a marked improvement. The number so occupied has sensibly diminished, and of those remaining the greater portion are better ventilated, and more thoroughly drained.

In view of the unavoidable drawbacks of this class of dwellings, it is, I think, desirable to restrict their occupation more stringently than contemplated by the present Tenement House Act, and, as far as practicable, altogether to prohibit their tenancy by families.

No establishments of this character exist in the Fifth Sanitary District.

Cesspools and cisterns have been a source of much annoyance, as the owners of property are seldom willing to fill them up unless the yard be sewered, and as many of the smaller streets are unprovided with sewers, this difficulty frequently occurs. Nevertheless, a large number have been filled up during the past year, and, as far as I can discover, no new ones constructed within the District.

A limited number only of cow-stables still remain in this part of the city, although in some streets, such as Willett and Sheriff and the upper portion of Cherry streets, their filthy condition has occasionally given rise to great complaint.

Where they exist, far less attention is paid to their drainage and cleanliness than to horse-stables, and their entire prohibition is, in my opinion, desirable.

The culverts have remained in comparatively good condition since the spring, but in the lower part of the District they are still frequently blocked up with the garbage and refuse of the gutters.

Many of the hydrant drains are still in an unsatisfactory condition, although greatly improved during the past summer. Wherever practicable, sewers or underground waste-pipes have been substituted for the surface drains. In many instances the curb-stones have been reset, and the gutter-level elevated to correspond with the proper grade. For the last few months a greater effort is also perceptible to keep the gutters clean.

In the general condition of houses and tenements, the Inspector is glad to be able to report a decided improvement. With few exceptions the required alterations in ventilation, cleaning, etc., are carried out by the owners, and the result is a gratifying increase in the comfort and health of the tenants.

Although reporting, as a matter of duty, all the deviations from the provisions of the Tenement House Act which are found to exist, the Inspector has endeavored especially to insist upon the increased ventilation of bed-rooms, the erection of ventilators in the roof, thorough whitewashing, and the proper drainage of the basements and areas of tenement houses. From other technical requirements, such as the sewer connection of privies, and the fire-escapes (as at present constructed), he deems the advantages to be gained very doubtful in value.

From time to time a large number of hydrants are found defective, either from obstruction of their supply or waste pipes, or from breakage from careless use; these have in all cases been promptly repaired, and whenever hydrants have been found in the areas of houses, their removal to the yard has been effected.

Dampness of cellars or the walls of houses, from defective gutters and leaders, is also a frequent subject of complaint. In all cases this has been temporarily remedied by repairing the leaders; but, as stated in the general Report of the Board last year, the character of the plumbing and other work is so poor that the same difficulty repeatedly recurs.

No establishments for lime or shell burning have been detected in the Fifth Sanitary District during the past year.

Although no large markets are found in this portion of the city, the butchers' stalls and small groceries, where vegetables are sold, abound in every block. At many of these establishments refuse and garbage collect in large quantities, and are either swept into the gutter or allowed to encumber the pavement, and, by their decomposition, constitute a prolific source of disease. In the great majority of cases, however, where complaints have been made, or warnings given to the proprietors, an effort is perceptible, especially since the summer, to keep such shops in a cleaner condition. In many of the butchers' shops lime is habitually used as a disinfectant.

A large number of new manure vaults have been constructed during the year, and the yards in which horse-stables are kept are much cleaner in consequence; the stables also are more thoroughly drained, and as the drains generally communicate with the manure vaults, the leakage of urine and liquid manure into the yards and basements of houses is in great measure prevented. In most cases the manure is removed daily, but no attention seems to be paid to the ordinance limiting its removal within certain hours.

Of the piers along the East River front of the Fifth Sanitary District little can be said, except in condemnation. The proper authorities have caused certain repairs to be made in the most urgent cases, but the greater portion are still in a rotten and

dilapidated condition; and in some the large gaps and crevices are constantly dangerous to life.

Large numbers of privy-vaults have been emptied and disinfected, and less cause for complaint certainly exists in this respect than at the beginning of the present year. Where street sewers exist, the law has been vigorously enforced of sewerage the privies. This has, doubtless, been beneficial in cases where the work was thoroughly done, the locality distant from the river, and the ground sufficiently high to allow a ready fall of the sewer contents; but in many cases the privy-vault has been rendered much fouler and more offensive than before the sewer connection was effected. This arises from the difficulty of connecting traps with the sewer-pipe, as is done with water-closets, and, in their absence, it is impossible to prevent the foul sewer air from regurgitating into the vault. In privies situated near the river, and on low grounds, this occurs with each ebb and flow of the tide. The liability to obstruction of the sewer-pipe forms another objection to their use, among a class of tenants who are prone to throw all kinds of rubbish into the privy-vault; for the cleaning of the sewer usually necessitates the stirring up of the contents of the vault, and is almost as offensive as the emptying of the privy.

Until the present system of city sewerage be materially improved, it is the result of my observation that the sewerage of large tenement house privies is practically a failure in the lower portions of the city. This impression is shared, I believe, by the Inspectors whose duties lead them into similar sections on the west side of the town.

A few rag-dealers are found along the upper portions of Willett, Sheriff and Ridge streets, and their establishments are sometimes so filthy as to require disinfection. As far as I can ascertain, however, no disease has occurred from this source within the past year.

The street sewers have been, in the main, in good condition since the spring. Several streets have been newly sewerage, and the work is still progressing in Sheriff, Columbia and the upper part of Monroe street.

Continued complaint is made along the wharves of the difficulties arising from the sewers emptying into the slips; at the large ferries this constitutes a public nuisance, as well as being highly detrimental to health. At the foot of East Houston street, especially, the stench arising from this source is sometimes insufferable; and the only means of remedying this difficulty is the extension of the sewers to the end of the piers, as already suggested by the Board of Health.

At several points in the Fifth District a number of large slaughter-houses are situated, the most active of which are those in Stanton street, near Attorney and Clinton streets. These, and all similar establishments in the District, have been repeatedly visited by the Inspector, who is satisfied that the proprietors evince constant anxiety to avoid giving cause of complaint, and, *as far as is possible with such a business*, conduct it in a cleanly and inoffensive manner. The slaughter-houses and cattle-pens are washed out daily, lime is freely used, and at frequent intervals the entire premises are whitewashed. The Inspector has, however, upon more than one occasion, expressed his conviction that it is impossible, in crowded sections of the city, so to conduct this business on a large scale as to prevent its being highly offensive and detrimental to health.

Further experience has only served to corroborate that opinion. In the slaughter-houses referred to, the blood that saturates the floor and overflows the sewer pipes into the street, the entrails and various refuse from the slaughtered animals which are collected in vats and carted off in large quantities, the inevitable filth of the

cattle-pens, where cattle are often kept over night, in violation of the orders of the Board of Health, combine to render them nuisances to the entire neighborhood.

No means of improvement can be suggested for such establishments; the business is necessarily and *per se* filthy and offensive, and nothing but its permanent prohibition in thickly settled quarters of the town can mitigate the discomfort to which it continually gives rise.

Some of the streets in this District are probably as uniformly filthy as any in New York; as such may be mentioned the upper portions of Rudge, Willett and Sheriff streets, Third, Fourth and Thirteenth streets, between Avenues B, C and D, Scamnel and the upper part of Cherry street. During most of the spring and summer these streets were swept with tolerable regularity, but were no sooner swept than refilled with garbage and rubbish by the residents.

Recently their condition has been dirtier than usual, and the Inspector trusts that some means may be taken before winter returns to secure the regular and efficient cleaning of these streets, which become almost impassable when snow and ice are superadded to the heaps of ashes and garbage that obstruct them.

A serious cause of complaint has existed for a long time in Clinton street, between Broome and Delancy, where, after changing the position of the railroad track, the workmen failed to restore the street to the proper level. Large hollows or excavations have consequently been left at these points, in which stagnant water collects after every rain, to the discomfort and annoyance of the residents. With these exceptions, the general condition of the streets is more satisfactory than at the beginning of the year.

No vacant or sunken lots exist in the Fifth District of a defective sanitary character; and, to the best of my knowledge, no swine are kept in this portion of the city.

Respectfully submitted,

CHAS. C. LEE, M. D.,

Sanitary Inspector.

New York, October 31st, 1868

E. B. DALTON, M. D., *Sanitary Superintendent:*

Sir—I have respectfully to submit the following report on the general condition of that portion of the Metropolitan District to which I am assigned as Sanitary Inspector, and known as the Sixth Sanitary District, and the improvements recently made therein.

The District includes that portion of the city of New York bounded north by Forty-second street, east by Sixth avenue, south by Fourteenth street, and west by the Hudson river, and comprises the Sixteenth and Twentieth wards, and a small portion of the Twenty-second ward. Its general topography, the width and direction of its streets and avenues, the natural facilities for drainage, and, with some exceptions, its geological formation, are all favorable to a good sanitary condition, and conducive to the public health. Nearly all of that portion situated south of Twenty-ninth street and west of Tenth avenue consists of ground reclaimed from the river, or what is known in common parlance as "made ground," and the same is true of the entire portion north of Twenty-ninth street and west of Eleventh avenue. The material of which this "made ground" is composed embraces dry earth, ashes, garbage, street sweepings, refuse matter and filth of every description, all forming a pernicious compound, saturated with water and decaying organic matter.

AREAS, ALLEYS AND YARDS.

The improvement made in areas, alleys and yards is apparent throughout the Sixth District, and more particularly so wherever the Tenement House Law has been enforced. The principal improvements are, more attention paid to cleanliness, well-trapped sewer connections, regrading, repaving, and well-constructed surface drains. Many areas were found having no means of drainage, so that during heavy showers of rain the basements adjacent thereto were often flooded to such an extent as to render them unfit for human habitations. Yards were found so unevenly graded as to contain large pools of stagnant water, poisoning the atmosphere with malarious exhalations, and alleys with uneven and broken pavements, wet with waste water from the hydrants at or near the entrance, giving to the narrow passage-way an atmosphere damp, chilly and repulsive.

The Tenement House Law requires that, where there is a sewer in the street, all areas and yards belonging to the tenement houses shall be connected therewith. This has been done wherever practicable, in all instances that have thus far come under observation, and the condition of the basements and cellars much improved thereby. The area is made to connect by a trapped-pipe with the sewer drain, and the yard is so graded as to discharge its surface water into the privy vault, whence it flows into the street sewer. Many of the hydrants have been removed from the alleys and located in the yards, and the waste water conducted into the privy vaults.

ASHES AND GARBAGE.

There is a decided improvement in the regularity with which ashes and garbage are removed from the sidewalks, though the plan at present pursued is not without its annoyances. The old method of disposing of the refuse matter from tenement houses was through the medium of a large box placed on the sidewalk, into which was deposited all the ashes, garbage and filth accruing on the premises until the box was full to overflowing, when its contents were transferred to the ash-cart and removed from the neighborhood. So irregular were the periods at which these boxes were emptied that their contents generally remained for days exposed to the influence of sun and rain, receiving daily fresh accumulations, overflowing the sides of the boxes, defiling the gutters and curbstones, and rendering the streets far more filthy than those streets where there were no such receptacles. It frequently happened that a box would be allowed to remain unemptied for so long a time that the removal of the putrescent mass became a very offensive operation, and the wooden structure itself so saturated with the fluids escaping from its filthy contents as to constitute, even when empty, a disgusting nuisance, impregnating the atmosphere with poisonous exhalations, and thus adding to the causes of sickness and mortality. It was therefore a wise action on the part of the Board to order the removal of all garbage boxes from the sidewalk, and institute some other plan for the disposal of this refuse matter. The plan at present pursued is to place the ashes and garbage on the sidewalk in pans, boxes, pails, or some other receptacle, to await the arrival of the ash-cart. Some families retain it in their apartments until they hear the bell that announces the arrival of the cart, when it is brought out with all possible dispatch and deposited in the proper place. Neither of these methods is without some objection. When the receptacle containing the garbage is left for an indefinite period on the sidewalk, it is often upset by mischievous boys, its contents emptied into the gutter, and the receptacle stolen to assist in kindling some bonfire, or to increase the stock in trade of the nearest junk shop. Again, those families who retain their garbage until the arrival of the cart, if dwelling on the top floor of large tenement

houses, often fail to gain the street with their loads until the cart has proceeded so far on its route that the driver refuses to return, and the garbage is either at once deposited in the gutter or left in the receptacle on the sidewalk, probably to meet the same fate as in the former instance. From this cause some of the streets in the Sixth District are often found to be filthy with ashes, garbage and other refuse matter, obstructing the gutters, and rendering the atmosphere insalubrious. This is particularly the case in some parts of Twenty-sixth and Twenty-seventh streets, Thirty-ninth and Forty-first streets, west of Ninth avenue, Thirty-second street, between Seventh and Eighth avenues, and several streets and avenues in the Sixteenth ward. These facts suggest the necessity for some further action in this direction, and the adoption of some temporary receptacle for garbage, constructed of a material that will not absorb fluids, and thus become a greater nuisance than the one it is intended to abate. Perhaps a box of the approved shape and size, made of wood that has been thoroughly kyanized, or saturated with carbolic acid, or some of the sulphate salts, might be kept sufficiently disinfected to be harmless.

BASEMENTS AND CELLARS.

The sanitary condition of basements and cellars has received a good share of attention. The Tenement House Law not only defines certain regulations concerning the construction of this class of apartments, but prohibits their being occupied as dwellings without a permit from the Board of Health. Whenever application is made for a permit to occupy any basement or cellar, it is referred to the Sanitary Inspector, who reports what alterations, if any, are necessary in order to fulfil the requirement of the law, and place the premises in good sanitary condition; and not until these requirements are complied with, so far as is deemed essential in each individual case, is the permit granted. A number of these apartments in the Sixth District have been vacated as untenable; yet most of them admit of the requisite alterations, which include sewer connections, a certain area space along the entire exterior wall, a clear space of at least one foot beneath the floor, and the ground there thoroughly drained. The provision for a certain amount of window space for the admission of light and air, and the ventilation of bed-rooms is also rigidly enforced. Many of the cellars and sub-cellars in the western part of the District, particularly on the reclaimed ground, are constantly damp from the nature of their location. In these cellars are found collections of vegetable fungi known as mould, usually resulting from moisture, in connection with a neglect of proper attention to cleanliness, or the decomposition of organic matter, always rendering the atmosphere unfit for respiration, and predisposing to the spread of malarious or zymotic diseases. Sewer connections, and a liberal employment of unslaked lime, are here clearly indicated.

BONE, OFFAL AND FAT BOILING.

There are at present no bone-boiling establishments in the Sixth District. There are nine fat-melting houses, in all of which the operations are conducted in steam tanks, so constructed that all vapors from the material within are either consumed or conducted through a condenser, and the offensive odors almost entirely destroyed. It was formerly the practice to conduct these operations in open kettles, the vapors from which escaped freely into the open air and were wafted over the city, contaminating the atmosphere of our streets, our dwellings and even our sleeping apartments with their poisonous gases. Under the present Sanitary authorities this evil has been so far mitigated as to be generally satisfactory, though peculiar circumstances or accidental causes will occasionally give rise to temporary annoyance. The busi-

ness is carried on only by permission from the Board, and I think the men engaged in it are so thoroughly convinced of the power, decision and integrity of the Board, as to fully appreciate the importance of not attempting to evade any of its requirements, but intend, as a matter of policy, if not of principle, to adhere strictly to the conditions on which their several permits are granted. In order that the business may be conducted without offence, it is necessary that each branch of it should harmonize with the others. The arrival of more fresh stock than can be disposed of in a given time, particularly in hot weather, will be followed by speedy decomposition of the animal tissues; or a want of care in removing the refuse matter from the tanks, or exposing it to the atmosphere before it is sufficiently cooled, will be attended with offensive odors. Again, I do not think the condensers so effectually suppress the offensive odors as the arrangement by means of which the gases are consumed by heat.

The operations of the New York Rendering Company were fully described last year; but it might be well to add that as the warm weather advanced, complaints were made of offensive odors emanating from their premises. The business of this company is to receive the dead animals and offal from the various parts of the city, separate the fat therefrom by means of heat, and transfer the residue to the country to be used for fertilizing purposes. Frequent inspections revealed a want of necessary precaution in the management of some of the details of their business, notwithstanding the perfection of their process of rendering; and after being several times admonished, their case was finally brought to the attention of the Board. The result of this was greater care in receiving and disposing of offal, more frequent cleansing and disinfecting of their dock and boats, and the practice of disinfecting the refuse before removing it from the tanks. Since the adoption of this latter practice, no further complaints have been heard.

COWS AND COW-STABLES.

The extensive cow-stables formerly occupied by swill-fed cows, have been entirely abolished; and but few cows are now kept in the District, and they at the rate of one to a city lot, and by permission of the Board.

HOUSES AND TENEMENTS.

The District contains every variety of dwelling houses, from the elegant brown stone structure of the wealthy merchant to the temporary shanty of the rag-picker. The better class of private dwellings are generally in good sanitary condition, having all the "modern improvements," and seldom requiring any attention from the Inspector.

Tenement houses occupy by far the greater portion of the Sixth District, and it is to this class of dwellings that attention has been more particularly directed, with a view of improving their sanitary condition; efforts urgently demanded, and thus far eminently successful. The typical tenement house, as it has hitherto existed in this city, may be described as a large brick building, four or five stories in height, each floor divided into four domicils for as many families. Each domicil consists of a main room and one or two bed-rooms, the former containing from 1,200 to 1,400, the latter each from 500 to 600 cubic feet of space. Each main room communicates directly with the external air, by two windows, while the bed-rooms, being situated between the front and rear main rooms, have no means of ventilation, except the door opening into the main room. A scuttle in the roof affords ventilation for the

hall during warm and dry weather only. The halls and stair-way being the common thoroughfare for the sixteen or twenty families that reside in the house, were generally found in a filthy condition; the floors covered with dirt and the walls and ceilings seldom whitewashed. The cellar was usually made the receptacle for ashes, garbage, house-sweepings, and every species of cast-off and refuse articles, often becoming so filthy as to be unfit for any legitimate use, while the atmosphere of the entire house was impregnated with exhalations from the lungs and bodies of its occupants, and the clothing, carpets and even the walls of the unventilated apartments were saturated with a profusion of odors from various sources, including the frying-pan, the tobacco-pipe and the baby's napkin.

The Tenement House Law has enabled the Board of Health to effect a radical change in this class of dwellings. It requires that each dark bed-room shall have a ventilating window communicating with the adjoining room, and also one communicating with the hall; and that the hall shall be supplied with a ventilator in the roof, so constructed that it may be open in all conditions of the weather. It also requires the roof, stairs, etc., to be kept in good repair, the cellar and yard to be regularly cleaned, and the halls to be whitewashed twice a year. These improvements have been made, or are now being made, in nearly all the tenement houses in the Sixteenth ward, in all of that part of the Twenty-second ward within the Sixth District, and in a large number of those in the Twentieth ward, and the result has been in the highest degree satisfactory, both to landlord and tenant.

The District contains a large number of shanties, most of them between Thirty-sixth and Forty-second street, and west of Ninth avenue. They are principally located on ground belonging to a large unsettled estate, and are built and occupied by "squatters." The shanty usually consists of but one room, which is occupied by one family, with sundry dogs, fowls, and perhaps a goat. It has no privy, and the ground around it is generally filthy with garbage, house slops and human excrements. The agent of the estate on which most of these shanties are located has recently exerted himself in endeavoring to improve their condition, and has secured more attention to cleanliness among many of them.

HYDRANTS, HOUSE-GUTTERS AND LEADERS.

Whenever yards and cellars are found to be wet from defective hydrants, waste-pipes, house-gutters or leaders, the fact is invariably reported and the defect remedied. These are all embraced by the Tenement House Law, and are included in the improvements made under its authority. Leaders are to connect with the sewer, either directly or by discharging into the privy-vault, and the hydrant and waste water is disposed of in the same manner by properly constructed waste-pipes.

MANURE, MANURE VAULTS AND STABLES.

There are several dumping-grounds in the vicinity of Thirty-eighth street, near the river; manure, however, is being removed therefrom, and it is advisable that some decisive measures be taken to prevent any further use of the ground for this purpose. In the various stable-yards in the District where there is no sewer connection, manure vaults are required, and so constructed as to receive stable drainage as well as manure. In this way many a side-walk is relieved from being daily overflowed with urine and stable drainage.

PRIVIES.

No branch of sanitary work hitherto accomplished was more urgently needed than the improvement made in privies. I found a large number of privy-vaults in my

District to consist of large holes dug in the ground and walled up with large cobblestones, without mortar, offering no impediment to the escape of filthy liquids into the surrounding soil, saturating it with putrid organic substances and fecal matters, to be exhaled into the atmosphere and impregnate it with the germs of disease. It was doubtless the peculiar condition of the soil, from this cause, and the poisonous exhalations emanating therefrom, that in former years rendered an epidemic of cholera so unmanageable, while the necessary reform will render each succeeding epidemic more easily controlled. So imperfect was the construction of many of these privy-vaults, that after a shower of rain their semi-fluid contents would not only penetrate the soil, but overflow the yards and often find their way into areas, basements, cellars and even sleeping apartments. Wherever privies of this description are found, they are reported, and the owners required to reconstruct the vaults with brick and cement, and connect with the sewer. This, in most instances, is done with but little delay. The Tenement House Law requires that all privies belonging to tenement houses shall be connected with the sewer, which is done, as far as practicable, wherever the law has in other respects been enforced. Privies thus constructed, though not fulfilling all sanitary requirements, are far better than the old-fashioned privy-vault.

It is desirable that some cheap, expeditious and inoffensive method be invented for the removal of the accumulations contained in privy-vaults, a most disgusting nuisance while in the wrong place, yet a mine of wealth if transferred to where it legitimately belongs. English agriculturists estimate the value of the average amount of effete matter from each individual, including both sexes and all ages, to be ten shillings sterling per annum; yet how to remove the vast amount of excreta from a city of nearly a million human beings, so as to be both inoffensive and at the same time preserving its fertilizing properties, is a problem yet to be solved, and he who succeeds in such an undertaking will prove himself a benefactor both to sanitary science and political economy. Success in such an enterprise would relieve our city of one serious cause of disease, and our slips of the poisonous gases constantly generated there from the putrid organic substances discharged from the sewers, while at the same time, by increasing the quantity and improving the quality of our agricultural productions, it would enhance both the wealth and sanitary condition of the nation.

If privy-vaults are properly connected with the sewer, and furnished with an adequate supply of water, their contents are removed from our presence with but little annoyance; but between the regulations of the Croton Board and the obstinate stupidity of the contractor, these connections often fail to accomplish the purpose for which they are intended. The Croton Board requires the sewer drain to be a certain distance above the bottom of the vault, and the contractor frequently lays it within two feet of the surface of the yard, leaving the portion of the vault below that point to become filled with night soil to be removed by the scavenger, the only point gained by the sewer connection being to prevent the accumulation above a certain level, while the retained portion is frequently rendered doubly offensive when agitated by the discharge of a leader during a heavy shower.

Many privy-vaults are constructed without any reference to the depth of the street sewer. This is the case in Forty-second street, between Tenth and Eleventh avenues, where the yards are so far below the level of the street, and the privy vaults so deep that they cannot be thoroughly drained, the sewer drain merely regulating the amount of accumulation which must be removed by the scavenger. One great difficulty with these sewer connections arises from the too common practice of throwing improper substances into the privy vault, thereby obstructing the drain, and often causing the vault to become filled to overflowing. Old hats, boots, coats, and

even dead animals are often fished from the entrance of the drain, and their removal followed by the speedy discharge of the accumulated contents of the vault.

I have previously expressed my conviction in favor of the school sink as being better adapted to the wants of the tenement-house population than the ordinary privy-vaults. Wherever I have seen these appurtenances, either at schools, factories or workshops, they appear to answer the purpose admirably, being always clean and nearly free from odor; and I still believe that if they were supplied to tenement houses, and had the same attention as those at schools and factories, the sanitary condition of our city would be greatly improved.

RAGS.

There are many rag-dealers in the District, as well as a large number of rag pickers among the shanty population. The rag-dealers, so far as I am aware, conduct their business in a proper manner. Though it may not at all times be easy to trace causes of sickness directly to this source, it is impossible to determine how far the articles in question may act as fomites, and become the direct agent for the propagation of disease. The rag-pickers often render themselves obnoxious by searching among the contents of the garbage pails and ash-tubs, often rendering the sidewalk and gutter filthy thereby.

SEWERS.

Sewers have been constructed in most of the streets and avenues. Those more recently constructed are in Seventh and Eleventh avenues, in Twenty-eighth, Thirty-eighth and Thirty-ninth streets. As soon as the street sewers are completed, owners of tenement houses are required to connect their several premises therewith. I have frequently noticed that many of the sewers in my District are inadequate to the emergency arising from a heavy shower of rain, the water at such times being forced back through the waste pipes, sinks and water closets, situated in the basements along the streets where such sewers exist. The cellars and basements on Eighth avenue, near Thirty-sixth street, have been frequently flooded in this manner, to the great annoyance of the occupants and the destruction of property, either from obstructions in the sewer, or want of capacity to receive and conduct away all the water from the buildings and side streets along its line. The same occurred to the cellars on Twenty-seventh street, west of Tenth avenue, from obstructions in the street sewer. A very great defect in our sewerage is from the fact that no attention has been paid to the natural drainage of the island, while constructing sewers, the original water-courses being filled up and the natural flow obstructed. The water from springs and marshy places, instead of finding its natural means of outlet, is thus left to percolate through the soil, collect in cellars and other low places, and with the help of decaying organic matter to fill the atmosphere with malarious exhalations. The point of outlet is another matter for consideration. Our sewers generally discharge into the slips where the tide has less effect in carrying away the filth thus deposited, than if they were extended to the ends of the piers. The constant accumulation in the slips of organic substances, faecal matters, the filth from factories, stables, slaughter-houses and fat-melting establishments, supplies a material for the manufacture of poisonous gases which are continually escaping into the atmosphere, and which might be, in a great measure, avoided were the sewers made to discharge at the ends of the piers. A gentleman of this city has proposed a plan for collecting at various points along the line of a sewer, the solid matter, to be removed at stated periods and used for fertilizing purposes. This plan has been fully described elsewhere, and has been adopted in the construction of one sewer in

the Sixth District. Though the plan might not meet all sanitary and agricultural requirements, it would relieve our slips, facilitate the cleaning of our sewers, and add much to our agricultural interests.

SLAUGHTER-HOUSES.

All the slaughter-houses in the Sixth District have sewer connections, and a few of them are kept in a tolerably clean condition. Most of them are not without some defects, which, with the nature of the business, and its effect on the sanitary condition of the city, have been fully discussed in former reports, to which I have nothing to add.

STREETS.

The condition of the streets shows but slight improvement since last year. Most of them are swept regularly, but not thoroughly. Most of them are paved with cobble pavement, which is very difficult to keep clean. The only streets that are kept in good sanitary condition are those that are paved with cubic blocks of trap-rock, and swept daily by private contract.

SWINE.

A large establishment near the foot of Forty-first street, where pigs are landed for the market, is the only one of the kind in the District. This is kept in good condition, but the odor escaping from the live animals is very offensive, whether these animals are confined or driven through the streets. * There are no pig pens of any other description in the Sixth District.

VACANT LOTS AND PONDS.

A number of sunken lots in the northwestern part of the Sixth District have been drained of their water by connecting with the sewer. Other lots are being filled up to the grade of the street.

In conclusion I would beg leave to acknowledge the valuable services of Dr. S. D. Wadworth, late Assistant Sanitary Inspector, in completing the tenement house inspection of the Sixteenth ward.

Respectfully submitted,

E. H. JANES, M. D.,

Sanitary Inspector.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent :*

Sir—The undersigned has the honor to submit the following report regarding the general condition of the Seventh Sanitary District, bounded north by Forty-second street, south by Fourteenth street, east by East river, west by Sixth avenue, and the changes and improvements made therein during the past year.

The general condition of the areas, alleys and yards, in my District, has been, on the whole, better this year than last. Many of these areas are damp, owing to the surface water from rear yards, which soaks into the ground and thence finds its way into the areas. Tenants also throw slops frequently into the areas. There are many yards in the rear of tenement houses which are damp and wet, because improperly drained. In some the original grade of the yard was good, but the flag-stones having become sunken, there exist depressions, in which water accumulates. In others the yard never has been properly graded, and the surface water, instead of flowing towards and into the privy-sink, tends towards the house, and flows

into the area. Quite a number of such yards have been repaired and regraded during the past year.

The removal of ashes, garbage, etc., has been carried on in about the same manner as during last year. In the best portions of my District, these refuse matters are taken away by private enterprise; but in the Tenement House District they are placed on the street sidewalk, near the curb-stone, where they are apt to remain long time before they are removed. They are placed in very unsuitable receptacles such as pans, small boxes and barrels, and these are often overturned by hungry dogs and goats, or by mischievous boys, and the contents scattered over the sidewalk and gutters. These small garbage receptacles have almost entirely taken the place of the old-fashioned, large garbage boxes, which, although a nuisance, were, I think, less objectionable.

BASEMENTS AND CELLARS.

There are only a few basements and cellars in my District which are occupied dwelling places. In most of the tenement houses the first floor is on a level with the sidewalk. Some of the cellars in Thirty-fourth street are damp and wet, owing to the inadequateness of the sewer in that street. Some of the wet cellars have been improved by connecting them with the sewers. In many instances several tenement houses have only one sewer connection; the sewer-pipe is insufficient to carry off the drainage of more than one house; as a consequence, this pipe becomes frequently obstructed, and, in removing obstructions, the cellar is often flooded with filthy water, and remains damp for some time. In my opinion the law should require that every tenement house should have a sewer connection of its own, separate and distinct from that of every other house.

BONE, OFFAL AND FAT BOILING.

There are no establishments in my District where the business of bone, offal or fat-boiling is now carried on. There are several establishments where lard is rendered, but the business is not offensive.

CISTERNS AND CESSPOOLS.

The old cesspools have been, many of them, filled up, and cisterns are very few and disappearing. It is rare to find one now, in making inspections.

COWS AND COW STABLES.

There are still a few cows kept in my District, but the stables are more clean and less offensive than in former years. There are no large cow-stables, not more than two or three cows being kept in any one. Most of these are in the upper part of the District, between First and Second avenues, Forty-second street and Thirty-eighth street.

CULVERTS, DRAINS AND DITCHES.

Several vacant lots, and sunken below the level of the street, have been drained by the construction of ditches and drains connecting with the street sewer.

HYDRANTS AND LEADERS.

Quite a number of hydrants have been connected with privy-sinks, and thus their waste prevented from running over the street sidewalk. Very many of the leaders of both private dwellings and tenement houses still remain unconnected with the sewers. In summer the roof drainage, passing over the sidewalk, is not a very great nuisance; but in winter the water freezes, the sidewalk is covered with ice,

and rendered dangerous to life and limb. I know of sidewalks in my District which were almost impassable, during last winter, from this cause.

CURB STONES AND GUTTERS.

The condition of the street gutters has improved, I think, during the past year, although in the thickly populated Tenement House Districts it is still very bad. This is partly owing to the neglect of the owners of the houses, in allowing the gutter-stones to become sunken and irregular, so that filth and stagnant water accumulate in the depressions; and partly to the filthy and careless habits of the tenants, who make the street gutter a place of deposit for refuse matters and garbage.

Many curb and gutter-stones have been taken up and relaid, according to the established grade, during the past year; and where this has been done, the garbage, and other rubbish thrown into the gutters, is much more apt to be washed away, by rain, into the street sewer.

HOUSES AND TENEMENTS.

The improvements made in the tenement houses of the city, during the past year, have been many and great. Owners of this class of property have never before done so much to render these dwellings of the poor comfortable, healthy and safe. The orders of the Board, and notices from the same source, are now, in many cases, willingly complied with within a very short time. This is owing largely, in my opinion, to the passage of the Tenement House Law.

In hundreds of tenement houses the ventilation has been improved. Bed-rooms, formerly dark and ill-ventilated, have had windows cut in them, so that there is direct communication with the external air, or with the halls of the houses.

In a large number of tenement houses ventilators have been placed in the roof, the construction of which increases considerably the circulation of air through the halls.

The halls, stairways, floors and ceilings of these houses have been kept in a more cleanly condition; the walls and ceilings have been more frequently whitewashed, and, in not a few houses, the tenants are required to take each his turn in scrubbing the floors of the halls and stairs, as well as the seat and floor of the privy building, this cleansing being done once every week. Both owners and agents are still reluctant to have their names posted in their tenement houses. I think there is no requirement of the law relating to this class of houses which has been so unwillingly complied with as this—that the names of the owner and agent shall be posted. Though the law has been in force for some time, there are only a few houses in which this has been done. Owners state that if their names are put up in the halls of the houses they are annoyed by calls from occupants; but in my opinion this requirement of the law has a salutary effect, as it stimulates owners to keep their houses in a condition such that they are not ashamed to be known as the proprietors thereof.

The privies of this class of houses have been kept in a much more cleanly and decent condition than during last year. Many old-fashioned vaults have been filled up, and new privy sinks or water closets constructed, with proper water supply. As compared with their condition at the time of the organization of the Board of Health, the privies in my district show a marked improvement, both in construction and in cleanliness. It is now the rule, rather than the exception, to find locks upon the doors of the privy buildings. Each tenant has his own privy (or each family theirs), and they are held responsible for its cleanliness.

The means of escape in case of fire are much more adequate than they were a year ago in these houses. At that time the only fire-escape was by scuttle and ladder,

the latter often being too dilapidated to support even one individual. Now, the scuttle and ladder has in very many houses given place to a staircase leading to the roof, while additional fire-escapes have been placed on the outsides of the houses.

In East Thirty-second street, between First and Second avenues, every house is a tenement. A year ago there was no sewer in this street, and as a consequence the cellars were wet, the basements damp and unfit for habitation, and the privies almost always full, as owing to the rocky nature of the ground the vaults were not more than three feet in depth. During the past year a sewer has been constructed, and now every house nearly has its own connection therewith. This has proved of great benefit to the indigent families who occupy the basements in this street. Most of these houses are now owned by thrifty Germans, who live in them, and take pride in keeping them clean. These houses present a happy contrast to the condition in which they were when they were all owned by one individual. No houses are so well kept as those in which the owner is himself an occupant.

LIME AND SHELL BURNING.

For a time the business of lime and shell burning was entirely discontinued in my district. During last spring two establishments again commenced operations, but were closed by orders of the Board. They were both in a thickly populated tenement house district, and were a great nuisance from the sickening odors which arose from them, as well as the offensive dust.

MARKETS.

There are no markets in my district.

MANURE AND VAULTS.

During the past year stable manure has been regularly and creditably removed from the various stables in my district. A large number of manure vaults have been constructed in the yards of private stables, and also drains connecting with these vaults, thus carrying off all urine and juices from the manure which accumulated in the stalls.

During the winter, owing to the ice in the East River, the proprietors of the dumping ground for manure were obliged to dump manure in large amount at the foot of East Thirty-eighth street. This was not removed until late in the summer, and was the occasion of great annoyance to those residing on the East River side of the city, and of frequent complaint to the Board. The dumping ground is kept cleaner than it was a year ago, and a high fence has been placed around it.

PIERS.

There has been no change in the condition of the piers in my district.

PRIVIES.

The improved condition of the privies I have alluded to under tenement houses.

RAGS.

There is very little traffic in rags in my district, and the business is carried on in such a manner as not to create any nuisance.

SEWERS.

The sewerage of my district has been improved during the past twelve months. Sewers have been constructed in First avenue, from Thirty-third street to Thirty-first street; also in Thirty-second street, and one is now being laid in Thirty-

first street. These were all greatly needed; the work upon them has been very slow, owing to the rocky nature of the ground. Nearly a year was occupied in laying the sewer from First to Second avenue, in East Thirty-second street. The sewer in Thirty-fourth street, from Second to First avenue, is very badly constructed, and is entirely insufficient to carry off the water even during a heavy rain. A new sewer in that street is much needed.

SLAUGHTER-HOUSES.

The number of slaughter-houses in my District has been reduced from sixteen to three or four. Those now in operation are kept in as good a sanitary condition as is compatible with the business carried on in them.

STREETS.

The streets have been kept in a tolerably clean condition, though many of them are so badly paved, and the pavement is so much in need of repair, that thorough cleaning is well nigh impossible.

SWINE.

No swine are kept in my District.

VACANT LOTS AND PONDS.

Several sunken lots have been drained during the past year; others have been filled with earth.

Respectfully submitted,

M. McLANE, M. D.,
Sanitary Inspector.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent:*

Sir—In accordance with the order contained in Circular No. 23, I respectfully beg leave to present the following report upon the general condition of the Eighth District, and to notice some of the changes and improvements made therein during the past year.

This District embraces about one-fourth of the entire area of the city, and extends from Forty-second street to Spuyten Duyvil creek, a distance of more than seven miles; and from Sixth avenue to the Hudson river.

The long strip of country included by these boundaries begins gradually to ascend at Fifty-seventh street, until its highest elevation is reached at Washington Heights. The high ridge of land thus formed has abrupt and rocky sides which descend to the Harlem flats on the east, and to the Hudson river on the west; the principal break being at Manhattanville (One Hundred and Twenty-fifth street), where a low valley runs across the entire island, from the Harlem to the Hudson rivers. Lying to the eastward, and above Tenth street, are the "Harlem flats," which present a very regular surface that is only a few feet above tide level. The built up portion of the District above described lays between Forty-second and Sixty-third streets; the region above this being sparsely settled with gentlemen's country seats, and an occasional cluster of shanties, and at present requiring very little sanitary interference. In this upper and northwestern part of the city the original general features and topography have not yet been encroached upon, but remain in their primi-

tive state. The springs upon the highlands give rise to numerous water-courses that find ready access to the rivers on either side, and afford channels for the surface drainage. Some of these water-courses run many feet below the level of the sewer yet to be built, and it is necessary that ample and thorough provision be made for their free passage beneath the sewers, whenever their natural channel leads thither. This provision can readily be made in the future, as it should have been in the past.

In a recent report upon the obstructions of one of these single water-courses we had occasion to state that the health and lives of hundreds of our citizens were imperilled by the obstructions made by the building of streets and avenues across the bed of a small stream that originally flowed in a rapid current to the North river. In this case the culverts under the various streets were not only too small to admit the passage of the stream when swollen by rain, but were also so loosely built that their sides soon fell in and dammed up the water, which accumulated in stagnant ponds, and sent up exhalations charged with malarial poisons that afflicted the whole neighborhood.

In the case referred to, the Board of Health caused the defective culverts to be rebuilt in a proper way, when the nuisance was at once abated.

Sanitary science acts for the prevention as well as the cure of such evils; and in view of this fact, and in behalf of the great upper portion of the city, which is yet unbuilt, but which is soon to be crowded with inhabitants, I beg respectfully to insist that in the building of new streets every provision should be made for the perfect drainage of the country lying about. In the district under consideration the natural advantages for drainage are unusually good, and it will be a disgrace to our civilization if, in the process of building streets and "improving" up-town property we leave the sanitary condition worse than we found it. General Viele, the President of the Board of Engineers, remarks, "it is folly to suppose that when the city is fully built upon, and the valleys filled up, no water will find its way into the bed of its original streams. I know to the contrary; and my own experience during my residence in a southwestern city while an epidemic was in progress, taught me that in all localities where there were original depressions in the topography, the disease raged with the greatest violence, although there was no apparent presence of water or even of moisture in the ground."

AREAS, ALLEYS AND YARDS.

The condition of the areas, alleys and yards has shown a marked improvement during the past year. During this time a systematic inspection of the tenement houses in the District has been going on, which has involved the careful investigation of the state of things outside the houses as well as inside. A very frequent cause of complaint has been found in the back areas which are often on a level with the floor of the basement, and entirely undrained. As a result of this the surface drainage from the badly-graded yard, added to the rain water which falls directly into these areas, finds its way into the basement, when it either sinks into the ground or stands in pools in the hall-way, or even in the dwelling rooms. As this water soon disappears from sight, the owners are apt to look upon its presence as a temporary inconvenience rather than as a source of constant danger to all in the house. In such cases the owner had been directed to grade the yard so that the surface drainage should flow into the street gutter, and the area has been drained into the street sewer.

ASHES, GARBAGE AND RUBBISH.

The removal of ashes, garbage and rubbish is thoroughly accomplished in some parts of the District, but in the main it is not done with any degree of efficiency. This, to a great extent, depends upon the scattered and isolated condition of the houses in the greater part of the District. Many of them are built upon ledges of rock high above the level of the street, and difficult of access. Under such circumstances the labor of carrying the ashes and garbage to the sidewalk is very considerable, and the temptation to throw them out of the back window, or into an adjoining vacant lot, is generally too strong to be resisted. A great deal of this garbage is collected by independent scavengers, each of whom makes certain rounds in the poorer neighborhoods, and collects ashes, garbage, etc., in rude carts, drawn by dogs, and the material thus collected is fed to such domestic animals as the scavenger may be possessed of. In this way a great amount of decaying matter is disposed of, that is entirely out of reach of the contractor.

BASEMENTS AND CELLARS.

Reference has already been made to the improved drainage of the basements in the District. Unlike those in some of the lower parts of the city, the basements are all above the tide level, so that it is possible to keep them dry. There are a few, however (not occupied as dwellings), situated on still unsewered streets, that become more or less flooded with water during heavy rain storms. In some of these the water finds its way under the house, through seams in the ledge upon which the house is built; and in others there is a naturally wet and springy condition of the ground. Under the orders of the Board of Health, such cellars have been pumped out or drained, and a few have required entire filling up with ashes or fresh earth. Attention has already been given to the ventilation of all cellars and basements connected with the houses inspected from day to day.

BONE, OFFAL AND FAT BOILING.

The business of bone, offal and fat boiling has been practically abolished in this District, since the order of the Board, which compelled all such establishments to adopt machinery and appliances that would insure the entire destruction of all offensive odors generated in the various processes. During the year several places have been discovered in which the business was surreptitiously carried on to a small extent, and at irregular intervals. In one instance the fat boiling was done in the night, or on Sundays, in order to avoid discovery and the punishment that is meted out to such offenders. There is one bone-burning establishment at the foot of Fifty-seventh street, North river, where animal charcoal is largely manufactured. The bones used for this purpose are imported, and reach the city in a thoroughly clean and bleached condition. In the process of burning, the bones are put into metallic casks, and then placed in large brick ovens and subjected to an intense degree of heat. The gases evolved are passed through the furnace fires underneath the ovens, where all the offensive odors are effectually destroyed.

COWS AND COW-STABLES.

The cows are usually kept in roughly built and temporary wooden sheds, that are one by one disappearing, as their neighborhood becomes built up. They are located in the poorest part of the District, and in thinly settled localities, and average from one to four cows apiece. No one is now allowed to keep cows, without a permit from the Board, and this can only be obtained upon such conditions as guarantee

that the stable shall not be a public nuisance, or detrimental to health. The manure is no longer allowed to accumulate and foster in heaps, but is removed from the premises daily, or kept in a tight manure vault, securely covered, and emptied at stated intervals. Some of these stables have been connected with the sewer, newly floored with plank, and subjected to such other changes and improvements as the necessities of the case demanded. The owners are mostly Germans, and have shown a characteristic disposition to comply with the requirements of the law. The cows are fed upon a mixed diet, consisting of "grains," from the Breweries, with hay and grass. They are well fed and well cared for, and present a healthy appearance.

CULVERTS, DRAINS AND DITCHES.

The most frequent cause of "citizen's complaints" has been found in obstructions to the drainage from houses and lots. These obstructions are most likely to occur in the drainage from tenement houses, and generally arise either from the breaking down of the cheap plumbing material, or from the carelessness of the tenants in throwing improper substances into the sinks and privies. If the obstruction is complete, the nuisance quickly becomes almost unbearable, the water from the waste pipes backing up and overflowing the sinks, and filling the house with an overpowering stench. The tenants at once notify the owner or agent, and if relief is not promptly afforded, they have learned to appeal to the Board of Health for relief. The Inspector visits the premises, and not only examines into the special cause of complaint, but also reports all other deficiencies in the sanitary condition of the house and premises. An order is then issued, and the owner is required to make whatever repairs and improvements may be necessary. If these are not accomplished within a reasonable time, the nuisance is abated under the immediate direction of the officers of the Board, and the owner of the house is compelled to pay a fine, in addition to the bill for repairs. As a rule, however, the work is now promptly done, and the evils remedied, without any necessity for direct interference by the authorities.

CURB-STONES AND GUTTERS.

No marked improvement in the condition of curb-stones and gutters can be claimed. Wherever the streets are well paved and kept clean, the curb-stones and gutters are found in good repair; on the other hand, the badly-paved streets that it is impossible to clean or drain thoroughly, seem to exert a demoralizing influence upon the individuals who are responsible for the state of the curb and gutter in front of their premises, and who feel that they ought not to be expected to do for the gutter what the city refuses to do for the street.

HOUSES AND TENEMENTS.

The changes and improvements in the houses and tenements in the District have been most satisfactory. The growth of this part of the town is very rapid, and a large number of new dwellings and tenements have been erected during the year. The "Act for the regulation of Tenement and Lodging Houses in the cities of New York and Brooklyn, passed May 14, 1867," has been conformed with in the construction of new buildings of this class, which are all well ventilated, lighted and drained, and are models of what tenement houses should be. A thorough inspection of the tenement houses in the District was commenced early in the year, and has been steadily carried on until nearly all the houses of this class have been thoroughly examined, and a special report made upon each house that was not found in perfect sanitary condition. This inspection included the entire house and premises, and

required an examination into the ventilation of each of the rooms and in the halls; the state of the roof, stairs and banisters, water closets and privies; drainage from the roof, yard and areas; sewer connection, sinks and traps; fire-escape, curb, gutter and sidewalk; garbage boxes, whitewashing and general cleanliness. When these inspections were commenced it was rare to find any tenement house that could be declared in good sanitary condition; and the special report upon each house declared in what respects it failed to meet the requirements of the law. The owner or agent was then notified and ordered to make such alterations and improvements as the case demanded, and after a reasonable interval of time a reinspection was made, and a report setting forth the state of things found at reinspection. These inspections were commenced among the worst classes of tenement houses, and have been continued until this time, when nearly all the tenement houses in the district have been subjected to the inspection and reinspection above described.

The typical condition of the tenement house as it existed before the operation of the new law showed an astonishing neglect of the elementary laws of health. This was specially observed in the deficient light and ventilation. In many cases enough money was originally spent upon the building, but it did not seem to enter in the "plan" to afford not only sleeping rooms, but also the means for their proper lighting and ventilation; and so the bed-rooms were made into cells, out of which the air, tainted with animal impurities, had no means of escape, excepting through the single door of entrance to the room. By the simple and inexpensive process of putting hall ways into all such rooms, and a ventilator at the top of the hall, an amount of good has been accomplished that cannot be measured or expressed.

HYDRANTS, HOUSE-GUTTERS AND LEADERS.

A large majority of the houses in the district belong to the tenement and shanty class, and these are almost always supplied with water from hydrants. The common arrangement is to have a hydrant located in the rear yard and used in common by all the tenants, and the waste water drained into the street gutter. Not unfrequently, however, there is no provision made for drainage, but the waste is allowed to fall directly upon the ground and run into the cellar. In some such instances the cellars have been found to have contained stagnant water for years. The leaders too sometimes empty rain water from the roof into the cellar. As such cellars are not likely to be drained, it follows, as a matter of course, that the water soon becomes stagnant and offensive, creating a constant dampness throughout the house, and rendering it unfit for human habitation. One not familiar with the facts would suppose that this state of things must be very rarely met with, and that such a crying nuisance could not long exist after the party responsible knew of its existence. The truth, however, is far otherwise; the complaining tenant is told to go elsewhere and do better, and perhaps turned out of the house for "giving it a bad name." In such cases the power of the law needs to be invoked, and the health and life of the tenant protected with the same jealous regard to his personal rights that the law shows towards his personal property.

LIME AND SHELL BURNING.

The only place where lime or shell-burning is carried on is at a large establishment for the burning of lime stone, at Fifty-fifth street, North River.

MARKETS.

There are no large public markets.

MANURE, MANURE VAULTS AND STABLES.

In the upper and unsettled parts of the District there are many small farmers and market gardeners, who are permitted to accumulate compost and manure on the premises; but in the built-up neighborhoods, the manure is either removed daily or is kept securely covered in tight manure vaults. When it is impossible, the stables are generally drained into the street sewer.

PIERS.

There are very few piers north of Forty-second street.

PRIVIES.

Most of the houses are furnished with privies instead of water-closets. They are usually located in the rear yard, and at some distance from the house. Great attention has been paid to keeping the vaults clean and disinfected; and where the existence of a sewer in the street rendered it possible, many have been connected with the sewer. New privy vaults have been built, and it has sometimes been necessary to clean out and fill up the old vault when it was too near the house, and locate a new one at a greater distance. Wherever sewers are being laid in the streets the privies are giving place to water closets, which are not only better, in sanitary point of view, but more economical as well.

SEWERS.

At the present time there are 30,125 feet of sewer under contract in this District and a little over 5,000 feet have been completed during the year. An efficient system of drainage lies at the foundation of a good sanitary condition; and although this is true everywhere, it is specially true in malarial regions. This is to-day the great necessity of the upper part of this island. Unfortunately the process of laying sewers is necessarily slow and expensive, from the fact that so much of their extent has to be blasted out of solid rock which underlies the surface of this part of the island; but apart from this, the natural advantages for drainage are strikingly good. The two broad and deep rivers towards which the grade descends, serve to receive and carry the sewerage out to sea, if it is once fairly discharged into the current. Some of the sewers, however, do not accomplish this, but empty their contents into the slips where the water is shallow, and where there is no current. As a matter of course they soon become filled with the most offensive materials, which are stirred up by every passing boat, until the air in their vicinity is rendered intolerably offensive.

SLAUGHTER-HOUSES.

The business of slaughtering is still carried on in a small way in several places, and with a temporary permit from the Board. This permit requires the slaughter-house to be located above the built-up portion of the city, and to be kept clean and thoroughly drained. Their sanitary condition is as good as the nature of the business will allow.

VACANT LOTS AND PONDS.

Whenever it has been possible and necessary these have been filled up or drained, as the case demanded, and much important work in this respect has been accomplished. In several instances whole neighborhoods have been relieved of what had long been offensive to the senses as well as a source of danger to life and health. In one locality thousands of loads of fresh earth were required for filling in a pond that was almost black with decomposing and putrescent material. The exhalations

arising from this pond exerted an undoubted influence upon the mortality from cholera in 1867. The immediate neighborhood of this pond formed one of the plague spots in that epidemic, which found victims wherever these poisonous odors extended. There is still a great deal of work to be done in the way of drainage, that cannot be successfully undertaken until new streets are opened and sewered, and the facilities for abating nuisances of this class thus afforded.

SWINE.

These animals are believed to be a nuisance at all times and in all places. They are practically abolished in all but the most remote and unsettled parts of the District

Respectfully submitted,

CHARLES W. PACKARD, M. D.,

Sanitary Inspector.

NEW YORK, October 31st, 1868.

E. B. DALTON, M. D., *Sanitary Superintendent :*

BOUNDARIES.

Sir—The Ninth Sanitary District is bounded, north, by Harlem River; east, by East river; south, by Forty-second street; west, by Sixth avenue and Central Park, and comprises the greater portion of the Twelfth and Nineteenth wards.

TOPOGRAPHY.

The general surface of this District is very uneven, consisting in part of low grounds, very little above tide-water, gradually rising into hills, some of considerable elevation, produced by out-cropping rocks, the substratum of which is composed principally of gneiss. The general inclination is in two directions, from the highest point, near Ninety-fourth street, on the west, towards the East river on the east, and towards Forty-second street on the south. On the northern end a high bluff terminates abruptly at One Hundred and Eighth street, where the flat lands of Harlem commence and continue to the Harlem and East rivers, with the exception of a high rocky promontory, called Mount Morris, at a point between One Hundred and Twenty-first and One Hundred and Twenty-fourth streets, Lexington and Madison avenues.

WATER-COURSES.

There were three or four original water-courses running across this District, their direction generally being diagonally across, from north towards south-east, emptying into the East river at four several points, viz: at about One Hundred and Ninth street and Fifth avenue, Seventy-fourth street and East river, near Forty-ninth street and East river, and about Thirty-eighth street and East river.

During the process of grading and filling up streets and avenues, these have been, in many instances, so obstructed, that many blocks, which are now far below grade, are covered with a considerable depth of stagnant water, having no outlet. Between the Third and Sixth avenues, and Fifty-fourth and Sixty-fifth streets, many examples can be seen. Also between Fifth avenue and East river, from Seventy-fourth to Seventy-ninth streets. During wet seasons these tracts of land are, for the greater part, covered with large bodies of stagnant, surface drainage. Many of the avenues and streets crossing these low lands are provided with sewers, but being of a higher grade than the bottom land, afford no means of drainage therefrom. A permanent injury has been thus inflicted upon these sections of the city by this

want of precaution in obstructing these natural water-courses, by thus damming them at the intersections of streets and avenues. The construction of buildings upon intervening blocks will now entirely prevent a proper under-drainage, and, as a consequence, deep sub-cellars will always be found damp, from the constant infiltration from these deep water-courses.

Those blocks located between Fifth avenue and East river, Seventy-fourth and Seventy-ninth streets, are yet but sparsely built upon, and should, before it is too late, be thoroughly drained, by constructing suitable deep drains or culverts along the original water-course, flowing across them.

The effect of these obstructions of the natural water-courses is evident by the constantly prevailing recurrence of malarial poisoning, which produces those forms of disease throughout these sections of the district, and the source of which is so often a puzzle, both to the inhabitant and his medical adviser. Long familiarity with these localities, as a resident for many years past, affords me more certain data with reference to the precise locality where these influences are likely to be felt, than could be obtained by a casual observer at the present date.

Two notable instances of the welling up of this under-drainage, came under my observation during the past spring and summer, one in Fifty-third street, near Lexington avenue, and the other on Lexington avenue, near Fifty-fourth street, where, during deep excavations for dwellings, the bottom foundation stones could not be laid for more than two weeks, from the constant flow of streams of water, until, by a considerable amount of puddling and cement, they were at last enabled to secure a foundation.

Had a proper conduit been laid, at a period when it was perfectly feasible to have done so, all this difficulty would have been avoided, and, beyond a doubt, much suffering, which will inevitably yet be produced by this wet underground, would have been thereby prevented. There being a substratum of rock not far below the surface of the original landed bottom, this water cannot soak or drain away, but must be constantly rising to the surface, and damp, unhealthy cellars will be the consequence, in very many instances.

In that portion of the district lying between Fifth avenue and East river, from about Sixty-fifth to Seventy-ninth streets, fevers of an intermittent and typhoid type, diarrhoea and dysentery, are almost constant. The want of proper drainage and sewers is undoubtedly the cause, and is preventable. One very obvious source of disease is found in the fact that the sewer in Seventy-fifth street (constructed about two years since), from Fourth to Third avenues, is some two feet lower in grade than the Third avenue sewer with which it connects, and into which its contents should flow. As a consequence, the sewage from the Third avenue sewer discharges through a large burst or opening in the 75th street sewer, into the low lands adjacent thereto, poisoning the atmosphere thereabouts.

SEWERS.

A large proportion of the streets and avenues in this District have been sewered, and many more are in process of construction. Where a perfect system of sewerage and pavement has been completed, more complete immunity from diseases of a malarial type is the rule, with the exception, as before mentioned, of those localities immediately adjacent to the old original water-courses. Harlem and intermittent fever, until recently, were almost synonymous terms, as applied to that portion of the District.

So late as about three years since, large tracts, in different portions of Harlem,

were subject to the ebb and flow of tide-water ; these lands are so slightly elevated, that a good system of sewerage is very difficult, sufficient grade in many places being impossible.

However, by filling in low lands, and raising the grade of streets and avenues, very much has been, and is being accomplished towards a better sanitary condition, and the enhanced value of long neglected lands in that vicinity, with the growth of population and enticements of the Central Park, are rapidly producing changes and improvements, which will render this portion of the District most desirable.

DOMICILES.

These may be divided into four classes : First, shanties ; second, wooden tenements ; third, brick or stone tenement houses ; fourth, good dwelling houses of various materials.

Shanties and their population, built of rough boards, generally of one story, which is from six to ten or twelve feet in height, the floor upon the ground, or but little raised above it, they form the simplest of domiciles. Usually without fire-place or chimney ; heated in winter by a stove, the pipe from which passes through the side or roof ; with from two to four windows ; most of them having but one room, sometimes with a small portion divided off for a bed-room, in which are found the family, two or three broken chairs, a table, cooking utensils, a bed, sometimes without bedstead, generally from one to three dogs, cats, with a sprinkling of poultry and a goat or two.

With such a medley, habits of personal cleanliness are an impossibility. Without sink or drainage, the house slops are generally thrown upon the adjacent ground. Usually, quite a number of these primitive domiciles are clustered together upon some rocky elevation, or otherwise profitless locality, without the least regard to order. For location, two selections are generally made, as before stated—one upon high rocky elevations, the other upon low marshy or bottom lands. The first are decidedly the most salubrious, in a sanitary view, as they are more exposed to changing currents of air, and consequently better ventilated ; while the second class not only suffer from dampness, but from being located below the grade of adjacent streets, against some bank or along the margin of a stagnant pond, receive mostly an impregnated miasmatic atmosphere. Hence it is found that the two localities generally suffer with different classes of disease. Those upon the more elevated situations from pulmonary or bronchial affections, while those upon the lower grounds from zymotic causes, such as earth exhalations and impure air generated in their own abodes, which are not dissipated by currents of pure air.

Happily, this primitive class of domiciles is fast disappearing ; the march of improvements, and the value of real estate increasing so rapidly, forces the occupants to seek other places for habitation. The ordinances of the health authorities have had much to do, also, with removing the greater inducements to dwelling in such habitations by the entire removal of swine from the city limits ; limitation of the number of cows, goats and fowls ; closing up of poisonous wells, and compelling the construction of sewer connections from the offensive shallow privy sinks belonging thereto, together with the greater accommodations and facilities for housekeeping found in the rapidly increasing number of tenement houses, affording such inducements that but few new shanties are being built, and the old ones are rapidly becoming obsolete. There are but three localities at present where any considerable number are found congregated in this District, viz : Between First and Third avenues, Forty-second to Forty-fourth streets, Fourth and Fifth avenues, Sixty-fourth to Sixty-sixth streets, east of First avenue, Fifty-ninth to Sixtieth streets.

WOODEN TENEMENTS.

These may be described in general terms as consisting of more than one story, occupied by one or more families, having several rooms, with good means of ventilation; provided with more or less of modern conveniences, such as Croton-water supply, sinks, sewer connections, and such like appliances for housekeeping. These mostly have been built for many years, as the requirements of the fire law build wooden structures below certain limits. Those built more recently beyond these limits are of an improved class, generally of the cottage style, provided with most of the modern improvements, as Croton water, sewer connections, baths, &c. These are really the most desirable of habitations, being usually adapted for one family, well ventilated, and securing that privacy, cleanliness and self-respect that is sure, not only to promote healthfulness, but good citizenship. Were it possible to raise all four, five and six-story tenement houses (models, so called), and substitute this class of dwelling for the lower classes, a great stride would be accomplished towards the elevation of our cosmopolite population, socially, physically and morally.

BRICK OR STONE TENEMENT HOUSES.

Respecting this class of domiciles very great improvements have taken place during the past two years. Previous to the enactment of the Tenement House Law, these houses were decidedly most insalubrious and unhealthy habitations. Notwithstanding wide and rectangular streets and avenues, affording unobstructed currents of air, whole blocks of four and five story tenement houses, closely adjoining, narrowly built, constructed in double form, in order to accommodate the largest number in the smallest possible space, prevented that amount of ventilation by pure air so necessary to the well-being and health of the occupants. Small close bed-rooms, with absolutely no means provided for change of air, was the rule, now, by the enforcement of the provisions of the law, there can be found but few of such rooms that have not been decidedly improved in this respect, and those buildings which have these provisions find ready tenants, thus affording proof that that class of occupants are becoming educated to the advantages of a better system of ventilation. Placing a ventilator in the roof over the hall staircase affords an outlet for a large proportion of the vitiated and impure air that formerly was confined to the upper portions of such dwellings.

Other sections of the law afford the vigilant officer such means for enforcing cleanliness as the neglect of the owner or agent in charge fails to accomplish.

Leaky roofs, insufficient Croton water plumbing, obstructed soil and sewer pipes, cellar refuse, and almost everything pertaining to defects about tenement premises, can be and are daily corrected. The exception is, in the the proper removal of garbage and ashes. This section of the law is entirely ignored by landlords, compelling the tenants to look personally after their own ways and means for securing removal. A better system might be instituted.

The principal evil regarding the tenement house, as now constructed and occupied, is the overcrowding, to quote from an address recently delivered by Dr. Ramsey at the Birmingham (England) Congress. On Social Science he remarks: "The physical surroundings of man mainly determine his degree of health, vigor and longevity. These are the elements of nature which are liable to deteriorations and require to be preserved and renewed for the safety of the community. As soon as men become crowded together, the air becomes vitiated. It loses oxygen and especially ozone; it gains an undue proportion of carbonic acid; worse, it is loaded with animal impurities. Living in bad air men's senses are blunted, especially smell; they sink into the lowest habits, and acquire the profoundest indiffer-

"ence to social order and purity. The chasm between the upper and lower classes widens. In ill-ventilated sleeping rooms and workshops there are found twenty times nature's allowance of carbonic acid, the cause of phthisis and scrofula. Smoky towns have the air impregnated with sulphurous acid, and sulphuretted hydrogen escapes from the sewers. But it is the organic matter in the atmosphere which is the most fearful result of overcrowding. This is the most prolific matter of disease. The closer the aggregation of unwashed multitudes the more horrible must be the results of atmospheric impurity. A murky mass hangs like a shroud over the city; a dismal list of noxious gases is so diffused through the air, that neither can the earth's heat radiate into space, nor can the warm beams of the summer's sun dispel the suspended canopy. The death-roll does not reveal the loss of health. A mere proximity of dwellings is a cause of disease. The conditions of health in towns are the speedy removal of all the debris of animal life, and everything which can corrupt the air by its decomposition; the free circulation of air everywhere—perfect ventilation; the introduction of air having the properties of ozone. But when population is crowded, even ventilation can only introduce bad air."

Personal visits to overcrowded domiciles vividly impress one with the truth of these observations. Peculiar and *sui generis* are the odors that constantly meet the olfactories in visiting these localities.

HOUSE DRAINAGE.

Deficient house drainage and sewerage is found to be one of the greatest evils connected with tenement houses. Almost the universal rule is to find that from three to eight or nine large four and five story buildings, crowded with families, will have but one connection with the street sewer, consequently, whenever an obstruction takes place therein (which frequently occurs), several houses must suffer from the foul noxious odors forced through the various drain and waste pipes connected therewith.

By a regulation of the Croton Water Department, a pipe of only six inches in calibre is allowed to enter any street sewer. This is entirely inadequate for the drainage and sewage of more than one house; yet, as before stated, usually three, and sometimes eight and nine houses, containing from five to twenty families, have but this one outlet to carry off all the waste water, rain water from the roof, and privy sink washings. This is a great evil and can easily be remedied by compelling each house to make a separate and independent sewer connection, and by so representing the facts to the Croton department that permits be given only for one house, instead of allowing several to be drained through one pipe.

BASEMENTS AND CELLARS.

Decided improvement has taken place in regard to these. By compelling the owners to obtain a permit from the the Board, the requisite alterations regarding ventilation have been secured, and where these could not be made (from the plan of construction), the refusal of the "permit" vacates them as dwelling apartments.

In general terms, the improvements regarding ventilation, cleanliness and drainage have been decided throughout the tenant house portion of the District within the past year. A large number of new ones have been built during the past eighteen months. Generally they have been constructed with a view to better means for ventilation; but their construction is objectionable on the score of overcrowding.

SLAUGHTER-HOUSES.

Of these there are at present eleven establishments. Their general condition is a decided improvement upon former years. A constant espionage ensures frequent cleansing and more care regarding the offensive material daily accumulated in the business. New and improved ones on the abattoir plan have been and are being constructed in the vicinity of the East river, between Forty-fourth and Forty-seventh streets, where it is to be hoped all the facilities needed for slaughtering for the city will be found, so that all those now located in the thickly settled portions of the city can be permanently closed.

TALLOW RENDERING.

This business as formerly carried on was a most offensive nuisance. There are at present but two such establishments in this District; these are located at and near the foot of Forty-fifth street and East River.

So decided have been the improvements adopted at these places, through the continued efforts of your officers, that a complaint of them is rarely heard. From boiling in open kettles, allowing all the offensive odors to escape into the surrounding atmosphere, the work is now done in close tanks, and the odors are prevented from escaping at all, being condensed and suppressed. The entire suppression of this nuisance throughout the city is one of the great benefits which has been accomplished through the Board of Health.

LIME AND SHELL BURNING.

Only one lime kiln has been in operation; that belonging to the Harlem Gaslight Company, at Foot of One Hundred and Eleventh street and East River. The offence from this is now entirely removed, and it is no longer a nuisance. The vapors and offensive gases therefrom are now all consumed by a furnace.

GENERAL CONDITION.

With the exceptions more particularly described in other parts of this report, the general sanitary condition of this District is much better than at any time during the past two years.

Many streets and parts of avenues that were unpaved have been paved or are being paved, and all with the trap-block or Belgian pavement; this ensures a more cleanly condition. Some of the most filthy portions of unpaved blocks adjacent to a large tenement population, which had become almost intolerable from long neglect, were cleaned by special orders under the supervision of your own officers. Almost at every point where sanitary aid was needed can be found unmistakable evidences of the value of a well organized Health Commission. Much has been done towards sanitary improvement, and very much yet needs to be done. The masses need instruction in the simplest laws of sanitary science, and until they are so instructed and made to feel the necessity of complying with such laws, are the efforts of health authorities requisite.

Respectfully submitted,

MOREAU MORRIS, M. D.,

Sanitary Inspector.

REPORT

OF THE

ASSISTANT SANITARY SUPERINTENDENT.

OFFICE OF THE ASSISTANT SANITARY SUPERINTENDENT, }
 METROPOLITAN BOARD OF HEALTH,
 BROOKLYN, November 1, 1868. }

E. B. DALTON, M. D., *Sanitary Superintendent:*

Sir—It has been the purpose of the officers of the Board in this city to take cognizance of all causes that were supposed to influence, injuriously, the public health. In order to reach the largest possible number of these causes, our citizens have been notified that they could co-operate with the Board by making known any existing specific nuisances. From this source 3,308 complaints have been received. These being regarded as of the first importance, the evils complained of have received prompt inspection, and when within the jurisdiction of the Health Law, every effort has been made for their suppression.

The additional experience of Drs. Bird, Colton, Fisk, Holley and Thayer, who still occupy the position of Sanitary Inspectors, renders their services of increased value to the Board. The appointment of Drs. J. L. H. Elmendorf, Charles Corey and C. C. Jewett, on the first of June as Assistant Inspectors, for the period of four months, permitted greater attention to be given to the inspection of tenement houses. Dr. Corey was detailed for this special duty in the Fourteenth ward, and Dr. Elmendorf in the Sixteenth. Their statements of work performed are contained in this report.

In March last Dr. Geo. F. Lewis, who since the organization of the Board, had occupied the position of chief clerk in this office, died of phthisis pulmonalis. His integrity of character; his familiarity with the operations of our municipal government; the accurate method of his office work and his entire sympathy with the objects which the Board seeks to accomplish, made him a most reliable agent. He has left in the records of this office many evidences of his skillful industry and the pleasantest associations with his memory.

The Board recognizing the fact that a legal adviser, who should be in constant communication with this office, would render our efforts more efficient, appointed, in June last, Mr. Wm. Coit as Assistant Attorney. Mr. Coit's unexpected departure for Europe led to the selection of Mr. Henry S. Bellows in his place. It is already manifest that his appointment will be of essential service.

The following table exhibits the number and object of the inspections made since October, 31, 1867:

	Total places in- spected.	Places inspected and complaints made to Board.	Places inspected and no cause of complaint found.	Places inspected and violations of the Code and Health Law re- ported.	Places inspected for the investi- gation of conta- gious diseases.	Places reinspec- ted.
1867.						
November	1,335	175	185	176	6	623
December	1,202	140	77	183	7	796
1868.						
January	987	248	118	78	4	541
February	967	165	98	69	7	628
March	1,162	276	131	93	.....	643
April	1,088	244	89	186	4	566
May	1,184	127	159	261	1	637
June	2,171	365	316	437	1	1,052
July	1,891	227	229	345	6	1,184
August	2,432	417	329	558	9	1,319
September	1,729	238	199	196	1	1,096
October	1,237	147	226	114	3	747
Total	17,275	2,768	2,154	3,396	49	9,908

The Code of Sanitary Ordinances has been relied upon to accomplish much of the work of the Board in this city. The following table exhibits the results:

Alleys cleaned	4	Drainage (improper) corrected	9
Alleys drained	4	Dumping grounds abolished	5
Alleys repaved and graded	2		
Areas cleaned	2	Excavations (in lots) filled	5
Areas repaired	5	Excavations (under stable) filled	1
Areas protected (dangerous)	5	Excavations (in yard) filled	7
Awnings repaired (wooden)	7	Excavations (in cellar) filled	5
		Excavations (in street) filled	1
Ballustrades repaired	3		
Basements cleaned	4	Fat boiling (business) abolished	2
Basements pumped out	1	Factory ventilated	1
Basements repaired	3	Fence repaired	1
Building excavation drained	1	Flagging repaired	6
Buildings (dangerous) secured	5	Flooring of house repaired	2
Bones removed (from storehouse)	1		
Butcher shop cleaned	1	Garbage removed (places)	5
Caloric Rendering Co. establishment aboliah- ed		Gas main repaired	1
Cellars cleaned	35	Goats removed (places)	4
Cellars pumped out	20	Goats confined (places)	2
Cellars filled in	2	Gutters (roof) constructed	4
Cellars ventilated	2	Gutters (roof) repaired	6
Cellar dwellings vacated	2	Gutters (roof) cleaned	1
Cellars repaired	5	Gutters (street) cleaned	9
Cesspools cleaned	65	Gutters (street) repaired	3
Cesspools repaired	21	Hallways cleaned	7
Cesspools covered	2	Hatchway secured	1
Cesspools filled	15	Hogs removed (places)	12
Cesspool constructed	1	Horses removed	2
Chimneys repaired or modified	13	Houses cleaned	3
Chicken coop (filthy) removed	1	Hydrant drains constructed	4
Cisterns cleaned	42	Hydrant drains cleaned	3
Cisterns filled	13	Hydrant basin trapped	1
Cisterns covered	9	Hydrants repaired	6
Cisterns repaired	5		
Cows removed (places)	20	Ice box drained	2
		Kitchen cleaned	1
Dead animals removed	2		
Dirt removed (places)	5	Lots cleaned	26
Drains opened	4	Lots filled in	39
Drains repaired	2	Lots drained	1
Drains constructed under sidewalk	129	Lots graded	6

Lots fenced.....	4	Smoke-pipe removed.....	1
Manure removed (places).....	61	Smoke-pipe modified and repaired.....	4
Manure vaults constructed.....	70	Snow and ice removed (places).....	12
Manure vaults repaired.....	3	Soil-pipe cleaned.....	90
Manure vaults covered.....	11	Soil-pipe repaired.....	31
Manure vaults drained.....	1	Stables cleaned.....	2
Oyster shells removed (places).....	1	Stables drained.....	24
Passage way to cellar secured.....	1	Stable floors repaired.....	3
Piggeries abolished.....	3	Stable yards cleaned.....	2
Premises drained.....	4	Stable bedding removed (places).....	2
Privies constructed.....	16	Stairs secured, dangerous.....	2
Privies cleaned.....	767	Steps repaired.....	4
Privies filled.....	87	Steam-pipes abolished.....	3
Privies repaired.....	62	Stones removed (pile of).....	1
Privies covered.....	2	Streets cleaned.....	66
Privies flushed.....	7	Streets repaved.....	2
Privy-houses cleaned.....	2	Tan pits emptied.....	1
Privy-houses repaired.....	27	Tan pits covered.....	1
Privy-houses (old) removed.....	2	Walls of houses repaired.....	2
Rags removed (places).....	4	Wall built at side of lot.....	1
Roof-water carried to street gutter.....	40	Water-pipes repaired.....	24
Roof leaders repaired.....	20	Water-pipes cleaned.....	1
Roofs repaired.....	25	Water-closets constructed.....	1
Roof ventilators put in.....	1	Water-closets cleaned.....	5
Rooms cleaned.....	3	Water-closets flushed.....	5
Sewer connections made.....	97	Water-closets repaired.....	9
Sewer pipes repaired.....	1	Well secured (dangerous).....	1
Sewer pipes cleaned.....	1	Well covered.....	1
Sewer pipes trapped.....	4	Well filled.....	1
Shell burning business removed.....	1	Well cleaned.....	1
Sidewalks repaired.....	16	Wood-shed cleaned.....	1
Sidewalks graded.....	2	Yards graded.....	57
Sidewalks cleaned.....	2	Yards drained.....	13
Smoke-house abolished.....	1	Yards filled.....	9
		Yards cleaned.....	97
		Yards repaired.....	4

STATEMENT

Of Violations of the Code of Sanitary Ordinances and of the Health Law of 1866, determined from November 1, 1867, to October 31, 1868, inclusive.

	Nov. 1867	Dec. 1867	Jan. 1868	Feb. 1868	Mar. 1868	Apr. 1868	May 1868	June 1868	July 1868	Aug. 1868	Sept. 1868	Oct. 1868	Total.
Abated on preliminary notices.....	154	140	111	43	43	71	159	263	227	241	220	123	1,797
Abated and defendant fined costs.....	8	11	9	17	3	2		2	0	9	3		75
Abated and case dismissed without cost.....	4	9		3	3	1	13	15	22	13	12	6	116
Abated and complaint withdrawn.....	10	1	1	3	2	2	0	1	0				36
Abated and judgment suspended.....													1
Abated and defendant fined \$15.....	1												1
Abated and defendant fined \$25.....										1			2
Abated and defendant fined \$50.....												1	1
Abated and defendant fined \$70, and in default imprisoned.....											1		1
Partially abated.....										3			3
Partially abated and complaint withdrawn.....	6							1	1		1		9
Partially abated and case dismissed with costs.....									2				2
Arrested, waived examination; not indicted by grand jury.....							1						1
Not abated and case dismissed with costs.....									2				2
Not abated, fined \$15 and ordered to abate.....			1						2				1
Complaint dismissed.....	20	5											6
Complaint withdrawn.....	20	25	19	3	1	1	7	9	6	2	10	1	116
	200	194	141	60	54	78	180	292	253	249	247	131	2,106

HORSE STABLES.

Complaints have been frequent respecting the condition of stables used for horses. The smaller ones are built upon the rear of lots, either with no manure vaults, or with those of improper construction. In many of these cases the evil has been remedied by enforcing the orders of the Board, directing the construction of vaults of a specified size with a proper cover. The larger stables, mostly used for livery purposes, have their frontage on principal thoroughfares, with the vaults for drainage and manure under the sidewalks. In those recently constructed every possible precaution is taken to supply ventilation; yet the existence of these stables in their present localities, with large numbers of horses, some of which are in an unhealthy condition, and the opening of the vaults for the removal of the refuse of the stables at any hour of the day, constitute a most aggravated nuisance. They cannot, however, be classed with establishments for swill or bone boiling, which admit of no degree of toleration, for stables are a necessity. Proper care in construction, including a system of ventilation, which shall be most healthful for the occupants and for residents in the immediate neighborhood; care in drainage; the removal, when possible, of the manure vaults from under the sidewalks, and emptying them at hours prescribed in the ordinance recently adopted by the Board, will materially lessen an evil which cannot be entirely removed.

COW STABLES.

Among the nuisances found to exist in this city at the time of the organization of the present Board of Health, none were more directly injurious to the public than the large cow stables, containing hundreds of bloated, diseased animals, fed upon swill from the distilleries, and furnishing milk for general distribution. The efforts of the Board to cause their removal failed, because by an ordinance of the city such stables were legalized. The Common Council refused to comply with a request of the Board of Health for a repeal of the ordinance, and it still remains one of the statutes of the city. After limiting the number of cows that may be kept upon lots of different sizes, the ordinance provides that "*nothing contained therein shall affect the keeping of more cows than therein provided by the owners of distilleries now in operation, in stables now built and occupied as cow stables, or by milkmen employed in the milk business.*"

In the outskirts of the city there are numerous stables, in which from five to fifty cows are kept. The rapid growth of the city having made the present location of many of them objectionable, a number of the owners have signed an agreement with the Board to move on the first of April, 1869; others are being proceeded against for violating the code. The number of cows kept in the stables connected with distilleries has within the year been materially lessened, owing to the closure of the distilleries by the United States authorities, and the cows now kept are fed upon better food. This is most fortunate for Brooklyn, which had acquired an unenvi-

able notoriety in connection with swill milk. In its place that of healthy cows in the country, condensed by the most approved methods, is brought to the doors of our citizens. No city, it is believed, is now supplied with purer milk.

LIME KILNS.

There are, in this District, four lime kilns that burn oyster shells. Two of them were, at the beginning of the year, so located as to be no nuisance; a third has been removed to a location that is comparatively unobjectionable; the owner of the fourth has recently been prosecuted by the Board for penalties, for non-compliance with orders to discontinue the business.

SWILL AND BONE BOILING.

A number of swill and bone boilers have been located for several years on East New York avenue, a much traveled thoroughfare, extending from East New York to Flatbush and Prospect Park. Connected with some of these establishments are large piggeries. The swill and garbage from hotels in New York city, brought over the ferries in the filthiest wagons, is here boiled and used as food for swine. Although many attempts have been made in the courts for their removal before the existence of the present Board of Health, and notwithstanding the repeated refusal on the part of the owners to comply with the orders of the Board, trials will soon be had in our local courts which it is hoped will lead to the breaking up of the entire business.

SLAUGHTER-HOUSES.

In August, 1867, the Board granted permits to fifteen men to conduct the business of slaughtering animals in the city. During the year two additional applications have been made and refused by the Board. The notice served by authority upon two of these men that their permits will be withdrawn on the first of March, 1869, is an indication of what is believed to be the purpose of the Board, viz: to confine the slaughtering of animals to two or three locations, which shall be in the outskirts of the city, and of ready access by water. Such a plan will do away with the necessity of driving cattle and swine through the streets of the city, and of removing the various refuse in filthy wagons, and will keep the sewers free from much decomposing materials that now flow into them.

THE SHORE OF THE EIGHTH WARD AND THE TOWN OF NEW UTRECHT.

The work of cleaning the beach from the city line to Fort Hamilton has been superintended by Mr. B. B. Baptist. He reports the removal of 1,927 dead animals, including sixty-five horses, twenty-five cows, beside a large quantity of butchers offal. Many of these animals were thrown from the docks on the water front of the cities, but it is reported that the principal part came from the New York offal boats as they went down the bay.

Two hundred and seventy-one (271) beds, and two hundred and forty-seven (247) pillows, thrown from immigrant ships, were also found on the beach and destroyed. The incoming tide, with a west and southwest wind, drives this refuse upon the shore. Such a mass of decaying matter and infected bedding, unless removed, would necessarily become a fruitful source of disease. The remedy lies in such a co-operation with New York officials as will provide a better way of disposing of such refuse material.

STREETS AND SUNKEN LOTS.

In April last your attention was called to the following facts :

I. That the street dirt and ashes which contain much animal matter in a putrescent condition, and the most of the garbage, are used for filling sunken lots ; that in the midst of this refuse cellars are dug for foundations of dwellings, whose occupants must breathe an atmosphere poisoned by exhalations that creep through every crevice from foundation to roof, and generate the lowest and most fatal types of disease ; that it is not infrequent for physicians to find the cause of low forms of fever in the emanations from the soil upon which houses are built, and that so well known are these facts that those familiar with the city, when seeking houses, avoid those districts where land is made by filling.

II. That the regulations made by the city for the removal of night soil and offal are in many respects disregarded ; that but a single dock is provided for the purpose, and *that* one in the Eastern District, thus necessitating for the most of the material a cartage of miles through the most populous parts of the city.

III. That, aside from the unhealthfulness and annoyance attending the present mode of disposing of the refuse of the city, it is important, in an economical point of view, that the material should be utilized as far as possible. This is deemed essentially important, as there is within a short distance of the eastern limits of the city a section of country comparatively unproductive on account of the expense of the necessary fertilizers.

IV. That the railroads, which have their western termini in this city, offer a convenient mode of relieving the city of that which in it is productive of evil only, and which in the country is demanded as a necessity.

This report, of which the above are the essential features, was referred by the Board of Health to the Common Council of this city, who appointed a special committee for its consideration. As yet no report has been made by the committee. Sunken lots are being filled with all manner of refuse, and the facilities for the removal of night soil and offal are not increased. The streets, owing to an amendment to the city charter by the last Legislature, permitting the aldermen to award contracts to others than the lowest bidders, have been in a cleaner condition than the year previous.

WATER AND SEWERAGE.

A plentiful supply of good, wholesome water, and a complete comprehensive system of drainage are necessities in every populous community.

These are being rapidly supplied by the Brooklyn Board of Water Commissioners. Water from the streams and ponds of the island was introduced into the city in 1858. Since that time 211.115 miles of water pipe have been laid. There are now 29,688 separate connections made with the street mains, yielding a daily supply of 17,000,000 of gallons, which it is estimated is used by at least 300,000 of the population.

The first public sewers were built in 1858. There are now 146.75 miles of different sizes and kinds. There are 24,267 connections with the sewers, of which 3,150 have been made during the last year.

PUBLIC SCHOOLS.

The public schools occupy forty separate buildings, twenty-five of which are built of brick and fifteen of wood. In these houses there are 31,000 sittings—the average attendance being 25,122. During the year there has been much improvement in many of the buildings, and a less crowded condition of the primary departments. The constant effort of the Superintendent of schools and local committees to have the teachers appreciate the necessity of frequent ventilation of their rooms; to have the recesses occur at short intervals, and to lessen the number in attendance in primary departments, will modify the evils suffered heretofore in many of the schools.

The rule of the Board of Education is enforced, which prevents any child from attending the school without being successfully vaccinated.

PERMITS FOR SHIPPING.

There have been issued from this office during the year 1,121 permits for vessels to unload at the wharves; the cargoes of said vessels consisting mostly of molasses, sugar, coffee, wool, hides, lumber and railroad iron.

TENEMENT HOUSES.

By an "Act for the Regulation of Tenement and Lodging Houses," passed May, 1867, a tenement house is defined to be "one that is occupied by more than three families, living independently of one another, and doing their cooking on the premises, or by more than two families on a floor, so living and cooking, but having a common right in the halls, stairways, yards," etc. During the year 1,691 such houses have been carefully inspected. The great majority of owners have readily complied with the notices from this office calling attention to the requirements of the law. But 393 have been forwarded to the Board for prosecution, and the notices sent by the Assistant Attorney have secured compliance in most of these cases. In the prosecution of their work the Inspectors have found ready access to all such houses. The specific objects sought to be accomplished have been to secure cleanliness, ventilation for dark bed-rooms, by means of transom windows; ventilation for houses, by a ventilator in the roof over hall-way (generally a ten-inch iron pipe with a metal cap); the means of

escape in case of fire, by strong stationary ladders, to the roof when buildings of the same height are contiguous, and by iron ladders from the roof to within a few feet of the ground, where the building is isolated; the introduction of Ridgewood water; the connection of yards and privies with the sewers, and the closure of underground apartments. As the Board cannot control the removal of garbage from the streets, no attempt has been made to compel receptacles to be provided for its reception.

The city is divided for the purposes of inspection into five districts, to each of which an Inspector is assigned.

Dr. COLTON reports as follows respecting the First District, comprising the Sixth and Twelfth Wards: 1st. As to Sewerage and Drainage. 2d. Streets. 3d. Tenement Houses.

SEWERAGE AND DRAINAGE.

The whole of the Sixth Ward, except at two or three unimportant points, has been sewerred, and is well drained. The whole of the Twelfth Ward, excepting a small district in the northeast corner, and a few short, cross streets, near the Atlantic Basin, is still unsewered and is poorly drained. During the last year the Sewer Board has not been conducting any operations in the ward, excepting the construction of a basin at the corner of Hamilton avenue and Court street, and connecting it with the main sewer at the nearest adjacent point. This was done at the request of the Health Authorities, for the purpose of conveying the surface water of Hamilton avenue and Court street into the river, instead of on some vacant lots, as hitherto, where it became ponded, stagnant and offensive. A great nuisance was thus partially abated. Some filling of the lots will probably be required in order to its complete abatement.

The general construction of the Twelfth Ward is familiar to the Board, and its needs, in the way of adequate drainage and sewerage facilities, have been too often canvassed to require any discussion here. There are difficulties in the way of applying a perfect system to this portion of the city, (the nature of the soil and the low general grade of the ward being what they are) but it would seem that its present condition could be materially improved without a great expenditure of labor or money.

Much of the water which accumulates in the large basins formed by the filling in and grading of the streets, is so ponded, because, in some instances, streets have been built without constructing any culverts under them, which would connect the block, either directly or indirectly, with tide water; in others the culverts are of too small calibre and become easily obstructed; and in one instance the floor of the culvert is two feet higher than the bed of the pond. These faults have been repeatedly reported, but, I think, remain for the most part unremedied. That portion of my district which is suffering most, perhaps, for lack of proper drainage and sewerage, is a little section of only three blocks, lying between Huntington, Mill, Court and Clinton streets. Many of the cellars contain constantly eight or ten inches of water. To pump it out remedies the evil only until the next storm. The water for the most part seems to rise through the ground itself, though some runs in from the yards. If these do not drain themselves into the cellars, they do into the out-houses, and these becoming full, overflow again the yards. The nature of the soil forbids the sinking of cesspools, which would be of more than temporary service. The only effectual remedy for the whole trouble would be a sewer in these streets,

with which connections could be made from house and yard, the collars being first filled in, if necessary, to the required level. Reports embodying these facts have been forwarded by the usual channel, but as yet no action has been taken.

STREETS.

I should not wish to bring my standard of cleanliness into disrepute, by claiming that the streets in my district have been in a condition forbidding criticism in a sanitary point of view, for they have been far from that. Yet I may safely assert that they have received more attention from the contractors than in any previous year of the Board's history. In fact, each year has shown an improvement in this respect. But however faithful the contractors may be, a condition of perfect cleanliness can never be maintained until the grading and paving of the streets are radically reconstructed, and until the tenement house population on their borders, where such is the character of the population, have proper facilities, and are taught to throw their slops into sinks connected with the sewer, and garbage into fit receptacles for it, instead of on the street.

The cobble-stone pavement, which is the kind used on all the streets, is the variety most difficult to clean and keep clean; and unless the stones are selected with care as to size and shape, this becomes almost an impossibility. They should, I think, be small and uniform in size, and when exposed of regular oval shape, in order that the little cup which is formed, where any three are joined, may be small and shallow, and the broom, or even the hoe, be able to dislodge its filling of mud or filth. Instead of this, one-half, probably, of the paved surface is covered with comparatively large, irregular, polygonal-shaped stones, the effect of which is to embarrass very much the satisfactory cleaning of the streets by any appliances at present used on them. The grading of the streets and gutters is greatly impaired in many places, and basins are formed in which water stands and stagnates instead of running off at once to the sewer basins at the corners. Some repairing in this latter respect is done from time to time, but by no means all that is requisite.

TENEMENT HOUSES.

My attention during the year has been directed chiefly to this class of houses under the requirements of the "Tenement House Law."

Up to the present time a register of four hundred and eight (408) such houses has been made on the books of this office. There are others yet unexamined, which will increase the aggregate in the whole district to about four hundred and fifty (450). The great majority are located in the western half of either ward, near the water front; are for the most part single houses, and three stories high, a few are four stories, and exceptionally, there is one of five stories. There are no rear tenement houses. The number of families ranges from four to fourteen, the average being probably about six.

With all these reported one or more faults have been found; the most constant being dark bed-rooms, a lack of proper ventilation, and adequate means of escape in case of fire. Very many have had no connection with the sewers. Notice of these defects, and of the manner of correcting them under the law, having been sent to the owners or responsible agents of the property, there has been, with scarcely any exception, a very gratifying willingness on their part to comply with all requirements, so that the result has been a vast improvement in the sewerage and drainage of tenement-house property; a great number of transom windows inserted in the dead walls of dark bed-rooms; of ventilators placed in the roof over the hall way, and stationary steps to the roof, where the house is one of a block, or an iron

ladder on the outside with landings at each story, when it stands alone. Occasionally other improvements than these have been introduced, but the above have been the most frequent and important.

I will be noticed from the size of the houses, and the number of families occupying them, that they are not the worst of their kind. This is so much to the advantage of the tenants; but I feel confident that this advantage has been very much added to by the modifications which have been recommended and effected. A grateful appreciation, in very many instances, on the part of those they were designed to benefit, makes this confidence more warrantable.

Dr. Holly reports as follows:

The Second Sanitary District of the city of Brooklyn, of which I have been Inspector during the past year, comprises the Eighth and Tenth wards.

The Eighth ward includes that large portion of the city bounded by the towns of New Utrecht and Flatbush, Flatbush avenue, Fifth avenue, First street, and the Gowanus canal and bay, and has within its limits Greenwood Cemetery and the larger part of Prospect Park. Its surface slopes, regularly and decidedly, from the crest of that portion of Mount Prospect range of hills, bordering the entire city of Brooklyn on its easterly side, towards Gowanus canal and basin, which bounds the ward on the west. This western portion of the ward (*i. e.*, between the canal and the line of Fifth avenue) embraces no inconsiderable portion of the low salt marsh meadows, which originally bordered the sinuous course of the old Gowanus creek, as well as several of the large mill ponds which have only disappeared within the past twenty-five or thirty years, and which were formed by damming the various arms of the creek.

These low lands, represented by that portion of the ward immediately contiguous to the present Gowanus canal, are now filled in and builded over by a poorer class of buildings and by numerous manufactories, etc., whose smoke, gases, odors, debris and drainage add materially to the insalubrity of the neighborhood. The canal itself, with no current except such as is formed by the ebb and flow of the tide, receives from these factories, as well as from other sources, numberless impurities which cannot be carried off, and which, consequently filling up its bed, serve only to increase the virulence of its noxious exhalations.

As a consequence of the topographical formation of the ward, its lowest or western portion receives the whole drainage from the range of hills on the east, and this immense water-shed, unrelieved by any system of sewerage, and caught in the hollows and interstices formed by the elevated grades of newly made streets and avenues now being rapidly constructed, forms numerous ponds, some of which are of very considerable size and depth.

In the absence of any sewerage in this ward, the only, and of course entirely inadequate, means of draining these ponds is by a series of connecting ditches, which connect with the street gutters, whence the water is diverted into the Gowanus canal. During the past year several of these ponds (of which, according to the annual report of 1867, there were thirty-one in this one ward) have been thus drained by the water commissioners. This state of things gives rise to the most numerous class of complaints made at this office, *viz.*, the flooding of yards, cellars, etc.

Privies also, which are in all densely inhabited districts a fruitful source of disease, are particularly so in certain portions of this ward, as from the nature of the ground they necessarily receive an unusual quantity of surface water, so that in

many cases the excrement even is carried by the overflow over yards and into cellars and basements.

Here again the only remedy is sewerage. There are but few tenement houses in this ward, although there are many small dwellings occupied by two or three families, which demand the constant attention of an Inspector.

The Tenth ward, one of the oldest in the city, has a population of 28,000, and embraces the district bounded by Fulton and Flatbush avenues, Fifth avenue, First street, Second avenue, Fifth, Court and Boerum streets. It adjoins the Eighth ward, and like that, embraces the sites of certain mill ponds around the head waters of the old Gowanus creek, which receive the drainage of the Mount Prospect range on the east, and of the Fort Greene highland on the north; as might, therefore, be expected its present sanitary condition closely resembles that of the Eighth ward, in having a large number of low frame dwellings or shanties along the border of the canal, and many low sunken lots constantly covered with stagnant water. It is, however, more fortunate in having by far its largest portion sewered, although a section of its southeastern surface is still without (much needed) sewerage.

In the Tenth ward there are two hundred tenement houses, sixteen of which have been completed during the last year, and have been built in conformity to the Tenement House Law. Of the remaining one hundred and eighty-four, one hundred and eighty have, during the last year, been so altered and repaired as to conform to said Tenement House Law; the remaining four are now in process of repair.

There have been emptied, disinfected and filled with fresh earth or ashes in said ward eighty-six old cobble stone privy vaults, and new oval brick vaults constructed, connecting with the sewer, according to the plan of the Brooklyn Board of Sewer Commissioners.

There have been filled seven hundred and nine low lots, upon most of which dwellings have been erected.

The filling in of Union street caused the formation of large ponds on the west of Fourth avenue, and south of Union street, which flooded the cellars and basements of the tenements in the vicinity, and in several instances obliged the occupants to abandon their houses. The large pond between Fourth and Fifth avenues, in which five human lives were sacrificed during the last summer, still remains and is greatly increased in depth and extent of surface by the filling in of Union street. By the opening of proper drains under Fourth avenue and Union street, this pond could be thoroughly drained and no longer remain a source of danger to life.

There is in the eastern portion of this ward, comprising the blocks bounded by Fourth avenue, Baltic, Nevins and Wyckoff streets, a considerable tract of land, which is used as a dumping ground; here is deposited temporarily the street dirt and garbage of several wards, together with the manure of numerous small stables. Dwellings are being rapidly erected in the immediate vicinity of this dumping ground, necessitating the discontinuance of the same.

With the abatement of the large ponds and dumping ground the sanitary condition of the Tenth ward will be greatly improved.

Dr. Thayer reports as follows:

The Third District comprises the First, Second, Third, Fourth, Fifth and Seventh wards. The first five extend along the East river from Atlantic street to the Navy Yard, including Brooklyn Heights and nearly all of the city which was inhab-

ited forty years ago. The Third ward, which comprises most of the Heights, is well sewered and in good sanitary condition. Below this, along the river, is the First ward, extending from South Ferry to Fulton Ferry. Its southern extremity is occupied exclusively with tenement houses, which a year ago were in bad condition, and in direct violation of more or less of the provisions of the Tenement House Law. The north side of Atlantic street, both sides of State street and Columbia street, the east side of Furman street, are wholly occupied with tenement houses, three or four stories in height, having from five to ten families each, and not one of them was in perfect sanitary condition or wholly complied with the requirements of the law—that is to say, in the spring of 1867, when the law was passed. Since that time they have been thoroughly inspected, and have nearly all complied with the law in all respects. The most important matter has been the sewerage. Few of these houses had sewer connections; they had old privy vaults and cesspools, and their slops were thrown into the street, maintaining a constantly foul and unwholesome atmosphere from their decomposition. They are now all connected with the common sewer, except in a few cases where it has been difficult to fix the ownership or responsibility. The block bounded by State, Furman, Atlantic and Columbia streets, is composed almost wholly of tenement houses. Those on State and Furman streets were in very bad condition. Forty families living in four of them, were dependent on one large privy, without sewer connection, and situated so low that it was kept constantly full, and sometimes overflowed by the tide, so that the premises were always in a bad sanitary condition. The first steps were taken in the summer of 1867 to supply these houses with proper water closets and vaults with sewer connections, and orders from the Board of Health were issued to that effect; but owing to persistent opposition on the part of a large proprietor, the work was delayed, and it was only after his prosecution for violation of the sanitary ordinances, that it was finally accomplished. Most of the landlords have, however, complied with the law upon being notified.

The streets of this part of the First ward were in an exceedingly filthy state in the winter and spring, all the slops and garbage of the tenement houses being thrown upon them. No contract was made for cleaning them, and in the month of June the filth was finally removed by a man temporarily employed by the City Council. In State street the piles of filth were so great that the street was nearly impassable, and the noxious gases that pervaded the atmosphere were productive of much sickness. The city authorities were repeatedly notified of the condition of the streets and its sanitary consequences. Since June the filth has been repeatedly removed, so that the evil has been much lessened.

The Second and Fifth wards extend from Fulton Ferry to the Navy Yard along the river, and southerly from the southwest corner of the Navy Yard to Johnson street. They contain a large number of tenement houses, having from four to eight, and in some cases twelve families each. Some of them were already connected with the common sewer, but nearly all violated some section of the Tenement House Law.

Nearly every tenement house in these wards has been inspected, and the owners have been notified of their violations of the law, and have, with few exceptions, complied with its requirements. A large number of sewer connections have been made, old vaults and cesspools filled, and new vaults or water closets built according to the regulations of the Sewer Commissioners.

Bedrooms have been supplied with windows, ventilators and fire-escapes have been provided, general repairs made, yards and cellars cleaned. A very few landlords have neglected the notices and orders of the Board, and suits have been com-

menced against them by the Assistant Attorney; in some cases they have been prosecuted in the Justice's Court of the district with the desired effect.

The enforcement of the Tenement House Law has been the most important of the sanitary work in these wards, and although not entirely completed, a very great advancement has been made in the condition of the tenement houses, amounting to an almost entire renovation, in Hudson avenue, John street, Plymouth street, Water street, Front Street, York street, Gold street, Bridge street, Main street and James street. In all of these streets there are some old or badly constructed houses, peopled with the most wretched and filthy class, which are only temporarily improved, and require frequent inspections to keep the law in force; but there are many houses well constructed and well ordered, whose owners and occupants are as desirous of having their premises in good condition as the Board of Health can be. The best houses are those where the owner lives on the premises, or has a family in charge. The most admirably arranged tenement house will not keep itself in order, but needs an interested person to look after it.

The upper part of the Second ward and the whole of the Fourth ward are nearly free from tenement houses. They have mostly two and three-story frame houses, in good sanitary condition; many of them have no sewer connection, but old cess-pools. A large number of water-closets have been substituted for the old vaults, where they had been dilapidated or out of repair in these wards, upon notice from the office of the Assistant Sanitary Superintendent, and the owners are generally fully aware of the importance and necessity of the change.

All the streets in these wards are sewered. The Seventh ward is only partly sewered, but it is not closely built, except between Myrtle and Flushing avenues. In this part there are some tenement houses, and many sewer connections have been accomplished during the year.

Although the enforcement of the Tenement House Law has furnished a large proportion of the sanitary labor, a very considerable amount of work has been done in other matters to which the health laws and sanitary ordinances refer. Several thorough inspections of slaughter-houses have been made, some of which are in the Fifth ward, in reference to their conformity to the ordinances, and also for the examination of cattle suspected to be infected with the Texas disease. The livery stables have been several times inspected. In the Seventh ward extensive cow stables near Flushing avenue have been inspected seven or eight times, in pursuance of orders of the Board of Health. Chemical and other factories in the Fifth ward have been inspected on account of nuisances complained of.

The most serious of all unhealthy influences remaining unabated in this district is to be found in the condition of the streets in which tenement houses abound, kept foul by the practice of emptying dish water and wash water upon them. The evil has been only partly abated in some of the houses where sewer connection has been made; the sewer connection does not wholly prevent the practice of throwing the slops into the street; the hydrant basins are seldom large enough to receive the slops, and in most of the houses there is no one interested to keep them out of the street. It is a sanitary evil of the gravest character under any circumstances, but in the absence of systematic street cleaning it becomes an intolerable nuisance, especially through all the spring and early summer, before the accumulations of the winter have been removed for the first time. After sewerage, it is far the most important matter relating to the sanitary condition of this part of the city.

The following is Dr. Bird's report of the condition of the Fourth District, comprising the Ninth, Twenty-First, Nineteenth, Eleventh and Twentieth wards, East New York, and the County Towns:

This large area has been inspected in reference to the complaints made of existing nuisances and to the examination of tenement houses.

Ninth Ward.—This ward, large in area, is thickly settled only in its lower third. It is but partially sewered, and contains many stagnant and offensive ponds, from which arise the main sources of insalubrity and complaint. The principal collections of water are bounded by Atlantic, Bedford, Myrtle and Central avenues.

Two ridges nearly parallel, viz.: Atlantic and Myrtle avenues, shed their surface water into the basin corresponding to the above boundaries. This basin is almost level, is nearly two miles in width, and of a surface area of about six square miles. The ridges are ninety-five feet above high water mark, the basin forty feet lower than the ridges, the soil is of a granular silicious formation. The flow and absorption of rain water on this plateau was never sufficiently rapid to prevent the formation of pools. As the natural water-courses became obstructed (by the farmers) and streets were graded, these pools were greatly increased in size and number. The ground is completely saturated, with no means of ready relief during storms, while in some portions water remains during the entire year. Malarious diseases are abundant and of a very severe and fatal type. Each year increases the amount of decaying material. A rapid increase of population around this wide area of our city, renders it urgently necessary that a system of sewerage be established, having for its main artery a brick sewer from Ralph and Atlantic avenues to Newtown creek. A large sewer, as indicated, would have a comparatively open and unobstructed country for its passage. Many of the smaller ponds in the vicinity of the built up portion have been filled. Many sewer connections have been made in the lower section; extensive washing away of streets repaired; the drainage from breweries conducted to cesspools; dangerous and insecure buildings made safe, and a number of smaller nuisances abated under the Code. But few tenement houses exist, and those have been brought up to the requirements of the Law of 1867.

Twentieth Ward.—This ward, the most cleanly, best sewered, and most healthful in the district, is thickly populated and free from any general or prominent nuisances. Its tenement houses have been reconstructed according to law, and complaints against private houses are usually abated by sewer connections.

Eleventh Ward.—This densely populated ward is neither healthy nor cleanly. The contractor for cleaning the streets has been prosecuted repeatedly for neglect of duty. Owing to the small size of the sewers, the large amount of refuse is not readily carried off, and their contents are forced into dwellings during heavy rain storms. There are a large number of tenement houses in which typhoid fever has frequently existed. By enforcing the law these houses are, in some instances, closed; others are more cleanly, properly sewered and less crowded.

Twenty-first Ward.—The principal nuisance in this ward is the swamp included between Sandford street, Myrtle, Marcy and Flushing avenues, which are graded some twenty feet above the low land they encircle. There are many dwellings in this area. Upon the recommendation of the Board of Health, the Sewer Commissioners dug ditches to the lower part of the Nostrand avenue sewer (the only one in the ward). These ditches, owing to various obstructions, now drain very imperfectly. This swamp has been for years a fertile source of disease.

The large cow-stables having been frequently a source of complaint, their owners

have been directed by the Board to remove them. The tenement houses are in good sanitary condition.

Nineteenth Ward.—Miasmatic and low forms of fevers prevail in a portion of this ward, owing to the defective drainage of the low lands and obstructions to the natural outlets by the filling in of streets. This section was in 1866 a vast swamp, with settlements by the Germans, who increased the tendency to disease, by the filth from cow stables, privies and piggeries. The drainage of this district was originally a natural one, running along the southerly side of the ward and parallel with Flushing avenue, forming the Wallabout Flats, receiving the outflow from the Twenty-first ward, and finding its exit along the government grounds to the East river. The River street and Kent avenue sewers now supply the place of this drain, and are entirely competent to receive the drainage of the entire district. Much has been done to improve the health of this ward. Stables have been drained to manure vaults, many sunken lots filled, and the character of the tenement houses improved.

EAST NEW YORK AND COUNTY TOWNS.

Inspections here have had reference to stagnant ponds of water, piggeries, dead animals, manure heaps and cow-stables. The nuisances arising from these causes have been mostly abated under the Code.

So much time has been necessarily consumed in the investigation of complaints in so large a district, that but little has been done in the way of house-to-house inspection.

Dr. Pisk reports as follows respecting the Fifth District :

The Fifth District comprises the Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth and Eighteenth wards.

Thirteenth Ward.—The sanitary condition of the Thirteenth ward is, from its salubrious location, the character of its population and efficiency of its drainage, superior to that of the remainder of the district. It being almost entirely built up and occupied by dwelling houses of the better class, the matters demanding attention, while important in the aggregate, are not individually of great magnitude; they appertain mainly to the instituting of sewer connections where necessary; the repair or improvement of defective ones already existing; the proper care of, and where unnecessary, the abolishing of cess-pools, cisterns and sinks. The tenement houses are comparatively few in number, and the owners of such as exist, have been compelled to alter and improve them, in accordance with the special law bearing upon that subject.

Seventeenth Ward.—The sanitary condition of the Seventeenth ward is now being rapidly improved, by the extensive sewerage in progress. This was greatly needed, as much of the ward is low-lying, with a wet soil, many vaults and cess-pools filling at once after being cleaned; and many cellars continually containing water. As in most localities recently built up, so here, we find many lots of an improper grade, water being thereby shed upon the adjoining premises; the rectifying of these, and the regulation of waste and refuse receptacles, and recently the instituting of sewer connections, have formed the principal items in the work here demanded. In addition, several establishments offensive and detrimental from their respective manufactures, have been suspended and removed.

Fifteenth Ward.—The Fifteenth is a ward in which much has been done in the way of sanitary reform. The southerly portion, of good elevation and well drained by efficient sewerage, is similar to the Thirteenth in the character of the work

found requisite. But the northerly portion, low, of made ground, and interspersed with large bodies of water, ponded by the grading of streets, calls for different measures in an attempt at improvement. Sections of sewers have been laid in this portion and large tracts drained thereby. Many sunken lots have been filled in, and raised to a proper grade. The amount of this sort of work done has been extensive, and the benefit is correspondingly great.

Eighteenth Ward.—The Eighteenth ward is large in extent, and although comparatively sparsely settled, is rapidly increasing in population. The great evil in this locality, is the utter want of drainage for the vast collections of surface water, ponded by the grading of streets and other obstructions to the natural water flows. The inhabitants of this ward can bear sad testimony, from the prevalence of miasmatic diseases, to the pressing necessity which calls for an adequate sewerage. Although well meaning and apparently well-directed efforts have been made to accomplish some good in this direction, the drainage of this large and beautiful section of our city is an object yet to be attained. It is to be hoped that the attention already aroused in the proper authorities with regard to this subject, will not be suffered to remit until the much needed relief is granted.

Dr. Corey's report on the Fourteenth ward :

The Fourteenth ward is in the Eastern District. It borders upon the East river ; is limited on the north, by Bushwick creek ; on the east, by Union avenue and Ninth street ; on the south, by Grand street. The soil, for the most part, is sandy and dry ; the surface gently undulating, yet sufficiently elevated throughout to admit of perfect drainage.

But though its situation and natural features be thus favorable to health, this ward, as will appear by reference to the Registrar's statistics, has hitherto been one of the most unhealthy in the city. It has been characterized in fact by an excessive mortality. Yet, this is no matter of surprise, for in its present condition, not a few causes are constantly at work, of which fatal disease is the legitimate result, and for which no remedy exists but an improved sanitary condition of the ward.

Of the various causes that tend to produce a high death-rate in this ward, the following may be named as the more important : want of sewerage, a filthy condition of its streets, the nature of certain business interests, the character of the inhabitants and their dwellings.

WANT OF SEWERAGE.

With the exception of a limited district in its northern part, the entire ward is compactly built up, has a dense population, yet not more than a third part is properly sewered. In its relation to the health of the ward, the want of sewerage is a most serious defect, and until it be remedied, whatever care be exercised in other respects, a high death-rate will continue.

THE CONDITION OF THE STREETS.

Throughout the summer, the streets, with few exceptions were in a most filthy and unhealthy condition, and I was repeatedly assured by residents of the ward, truthfully, I can easily believe, that they had already remained so for many months. In the more populous streets there were accumulations of manure, ashes, garbage and decaying rubbish ; the street gutters in many places, were so obstructed as to cause their contents either to flow upon the surface of the street, or to stagnate in filthy pools, thus to become new centers of infection ; while upon sidewalks, in yards and

areas, boxes of most offensive garbage were suffered to remain unc and this in mid-summer. There can be no question but that the wretched condition of its streets has been a fruitful source of fatal disease, in this ward, especially among children.

KINDS OF BUSINESS DETRIMENTAL TO HEALTH.

The various manufacturing and other business interests in the ward that would seem to be detrimental to health, by rendering the atmosphere impure, are the following; three iron foundries, two glass houses, five varnish factories, gas works, a soap boiling establishment, a felt roofing manufactory, a slaughter-house and two shell lime kilns. It is believed that these several interests are conducted with reasonable care, yet it cannot be denied that their prosecution necessarily causes an amount of smoke and dust, or the liberation of gases, which if not in themselves injurious to health, are certainly destructive to the comfort of those living near them.

In this connection allusion may be made to the removal from the city, of dead animals, butchers' offal, night soil, etc. The contractor for this work makes use of the dock, at the foot of North Sixth street, and so far as frequent visits to the place enable me to judge, has conducted his work with more regard than formerly to the health and comfort of the neighborhood. As a general thing during the summer these substances were removed daily, and the dock has been kept reasonably clean, and frequently disinfected. But, as carried on at present, the work is at best a nuisance, of which the people of the ward have just reason to complain, and for the abatement of which, some means should be devised.

THE INHABITANTS AND THEIR DWELLINGS.

The population of the ward is made up very largely of persons of foreign birth, many of whom are doomed to live in crowded tenements, dark and badly ventilated basements and other miserable homes, made doubly wretched by poverty and degradation; ignorant of the simplest laws of health, the daily life of thousands is such as to favor disease and death, and while efforts are made to improve their houses and surroundings, they need to be taught at least the elements of hygiene; the necessity of personal cleanliness, and of ventilation and cleanliness in their dwellings. And this is being done through the agency of the Board of Health, whose efforts in their behalf are readily understood and appreciated.

THE WORK OF THE BOARD.

The work of the Board, as prosecuted in the Fourteenth ward, under my observation, has consisted in efforts to improve the sanitary condition of tenement houses, by requiring them to be so modified in construction, as to conform to the law of 1867, "for the Regulation of Tenement and Lodging Houses," and the abatement of such nuisances, as from time to time were complained of by the citizens of the ward, or chanced to come to my knowledge while engaged in the work of inspection.

By the direction of the Assistant Sanitary Superintendent, it was made my first and most important duty, carefully to inspect and report the number and condition of tenement houses in the ward; accordingly I entered at once upon the work of a house-to-house inspection. In this way 413 tenement houses were inspected. Of this number 294, were found, more or less deficient, according to the law of 1867, 119 had already been inspected and the requisite improvements made in them, or had recently been finished in conformity to the law for their construction.

Of the number against which complaints were made (294) one hundred and nineteen have already been made to comply with the recommendations specified in the complaint. Of the ninety-seven remaining, the owners of eight, with the permission of the Assistant Sanitary Superintendent and for various reasons, have been temporarily relieved from the changes required, while eighty-nine are in process of reconstruction, or have been referred to the Assistant Attorney of the Board for prosecution. The following are the principal nuisances abated during my four months' service:

- 58 privy-vaults emptied, disinfected and cleaned.
- 7 privy-vaults emptied, disinfected and cleaned, and filled with earth, new vaults made in their stead and properly connected with the sewer.
- 29 imperfect drainage made to conform to Code of Sanitary Ordinances.
- 3 yards cleaned and disinfected.
- 3 vacant lots cleaned and fenced.
- 3 cess-pools emptied, cleaned and filled with earth.
- 10 stable-yards, manure removed, yard cleaned and manure vault made.
- 3 cellars cleaned and whitewashed.
- 2 junk-shops cleaned and whitewashed.
- 2 butcher-shops cleaned and whitewashed.
- 3 piggeries abolished and yard cleaned.

Dr. Elmendorf's report of the Sixteenth ward:

Immediately upon my appointment as Assistant Sanitary Inspector (June 1st), I was assigned to duty in the Sixteenth ward, and this part of the city was under my exclusive care until my term of service expired, on the 1st of October.

This District has always been one of the most unhealthy in the city. During the nine months ending September 30th, the total mortality of the Sixteenth exceeds that of any other ward by two hundred and fourteen, while the number of deaths from zymotic diseases is greater by fifty-five. The only cases of typhus fever reported during this time are from the Sixteenth ward, and through the summer months the death-rate from diarrhoeal diseases was fearfully high. The same ratio between this section and others has also obtained in former years, with the exception of 1866, when, during the cholera epidemic, the Twelfth, Fifth and Sixth wards principally suffered. The causes which produced this result are numerous.

I. THE NATURE OF THE SOIL.

The land lies low, and is almost entirely level. The upper soil, varying in depth from two to five feet, is light and porous, while underlying this is a dense stratum of yellow clay, which forms a perfect barrier to the passage of water. Hence, a cellar cannot be dug without becoming immediately flooded: privy-vaults fill at once almost to the surface of the ground, and, after a moderate fall of rain, yards and vacant lots remain marshy sometimes for weeks. On this account many houses are built without sub-cellars, the floor of the first story being laid directly upon the ground; thus it is damp, and the occupants are exposed to the unhealthy emanations from the earth. A frequent mode of constructing privy-vaults is by sinking a water-tight cask. It is needless to say that such a receptacle soon becomes very offensive.

II. THE CHARACTER OF THE POPULATION.

The population, according to the census of 1865, was 24,349, but the growth since then has been rapid, and the number now must be nearly 30,000. Perhaps ninety

per cent of the inhabitants are Germans, the remaining ten per cent being made up of negroes, Irish and Americans.

The Germans are thickly crowded together in tenement houses, and though generally neat and cleanly, both as regards their persons and their dwellings, live for the most part upon indigestible food, consume an immense amount of wine and malt liquor, pay no attention whatever to ventilation, and disregard nearly every law of health. They are somewhat isolated from their fellow citizens, forming a community of themselves, speaking their native language, and following the customs of the "Fatherland." They are good natured and law abiding, rarely refusing to comply with the notices of the Board, when they are made thoroughly to understand their meaning.

III. WANT OF SEWERAGE.

The peculiar necessity existing for a proper drainage system in this District will be seen from what has been said before in relation to the nature of the soil. Yet, on the 1st of June, the little quadrangle bounded by Twelfth, Ninth, South Second and South Sixth streets was the only part sewered. During the last few months, however, the Board of Water Commissioners have been actively at work, and it is hoped that before the close of the present year this prominent cause of high death-rate will be removed.

IV. SUNKEN LOTS.

When the streets were laid out and graded no regard was had to the water-shed of the section, but embankments were thrown up which prevented the surface water from flowing off by the natural descent of the ground; hence it results that sunken lots and stagnant pools are more numerous in the Sixteenth ward than in any other.

In many places there are ponds with a superficial area of 20,000 to 40,000 square feet, and of a depth varying from two to fifteen feet; these oftentimes being covered with confervous vegetation. From the localities where these abound we have constant reports of cases of typhoid and typhus fever, and many of the people in the neighborhood evince the malarial cachexia in a marked degree. The Board of Health has been hitherto powerless to effect the abatement of this prolific source of disease, because of the want of sewers in the streets by which the water could be carried off; and even now much difficulty will still be experienced in this matter, by the Inspectors, for property in such a condition is so undesirable that it is often sold over and over again by the city for unpaid taxes, so that the rightful owner can seldom be found without much trouble, and a great expense of time. While the sanitary care of the ward devolved upon me, one of the largest of the ponds was drained by the city authorities, as it was reached by the sewer in process of construction.

V. TENEMENT HOUSES

The greater number of the dwelling houses are occupied by from four to eleven families; and it was seldom that I came upon one containing less than three. About one-half of the tenement houses are built of brick, the other half of wood. They are not as a rule large, but substantially constructed, and clean. The chief causes of complaint were the want of proper ventilation, and the need of adequate means of egress in case of fire. In nearly every house that I inspected there were dark bed-rooms, either entirely without windows, or with these so small as to afford only a very partial circulation of air. I regret that I am unable to state definitely the total number of tenement houses in the ward; but during the four months I had time to visit only about one-third of them.

WORK OF THE BOARD.

The appended summary, in a tabular form, will show more completely than could be done by a simple statement, the work accomplished by the Board during the summer. It will be seen that the number of visitations is large compared with the number of nuisances abated; this arises from several circumstances:

1. The great majority of property owners do not understand English, and in consequence often misunderstood the notices or orders sent to them; hence they failed to comply with them; or endeavoring to do all required committed errors which it took time to rectify. On account of the difficulty of making them comprehend what was needed the most minute directions had to be given about the simplest matters.

2. The condition of the streets, torn up for laying the sewer, impeded the work of those making extensive repairs to tenement houses, and absolutely prevented the emptying of privies and the filling up of lots. Then, too, many sought and obtained permission to delay other improvements till the sewer was ready to be tapped, that all might be finished together.

3. On the first of October nearly all the nuisances complained of were either in process of abatement, or the responsible parties were under prosecution by the Assistant Attorney of the Board; so that much preliminary labor was expended which does not appear at once, but which will manifest itself during the present month.

MATTER AND THING.	Inspections.	Complaints.	No cause.	Violations of Code.	Contagious diseases.	Reinspections.
Tenement houses.....	620	233	11	7	1	368
Privies and water-closets.....	245	.....	17	73	.....	155
Private dwellings.....	58	.....	23	15	.....	20
Defective drainage.....	85	1	9	25	.....	50
Streets.....	45	.....	2	20	.....	28
Vacant lots.....	73	.....	7	22	.....	44
Stables.....	52	.....	2	20	.....	30
Yards.....	22	.....	1	8	.....	13
Cellars.....	13	.....	.....	6	.....	7
Cisterns.....	1	.....	1	.....	.....	.....
Hydrants and hydrant basins.....	4	2	2	.....	.....	.....
Manufactories.....	9	.....	5	2	.....	2
Pumps.....	1	1	.....	.....	.....	.....
Sewer basins.....	5	3	2	.....	.....	.....
Fat-boiling establishments.....	3	.....	1	1	.....	1
Dangerous chimneys.....	2	.....	.....	1	.....	1
Cesspools.....	3	.....	.....	2	.....	1
Butchers' shops.....	2	.....	.....	1	.....	1
Pigs.....	1	.....	.....	.....	.....	1
Cows.....	1	.....	.....	.....	.....	1
Total.....	1,245	240	83	208	1	718

Of the foregoing, the following is a list of those nuisances permanently abated the balance being in process of abatement or under prosecution on the first of October, when my term of service expired:

Tenement houses (made to conform with the law).....	82
Privies (emptied and disinfected).....	94
Private dwellings (made habitable).....	9

Defective drainage (made sufficient).....	21
Streets (cleaned).....	19
Vacant lots (drained, graded, cleaned and fenced).....	9
Stables (cleaned and properly drained).....	13
Yards (cleaned and properly graded).....	7
Cellars (cleaned or drained).....	5
Hydrant (repaired).....	1
Manufactory	1
Fat boiling establishment (suppressed).....	1
Dangerous chimney (repaired).....	1
Cess-pool (emptied and filled up)	1
Butcher shop (cleaned and whitewashed).....	1
Pigs (removed beyond city limits).....	2
Cows (removed beyond city limits).....	2
Total	269

It will be seen from the foregoing statements that the needs of our city are:

- I. An extension of the sewers.
- II. Clean streets.
- III. Prompt and proper removal of dead animals, offal, night soil and garbage.

The Board of Sewer Commissioners are co-operating willingly with the Board of Health. The area of the city, however, is so large, and the demands made for sewerage come from so many sections that it will require much time to remedy the evils consequent upon deficient drainage.

The public naturally, and very properly, look to the Board of Health for the removal of all that which is detrimental to comfort and health. It is, therefore, most unfortunate that interests that vitally affect the sanitary condition of the city are entirely beyond the control of the Health authorities. The Board has most unjustly been held responsible for streets imperfectly cleaned, and for all the inconvenience of having no responsible contractor for the removal of offal and dead animals, for the want of proper care in disinfection and disposition of night soil, and for the entire absence of all arrangements for removing garbage.

Legislation is needed, and should be urged, to secure for the Board of Health a controlling influence in making and enforcing contracts for doing all that is so intimately connected with the public health.

Respectfully submitted,

J. T. CONKLING,

Assistant Sanitary Superintendent.

“B.”

NEW YORK, November 15th, 1868.

To the Secretary of the Metropolitan Board of Health:

In presenting this third annual report from the Legal Department, I am able to congratulate the Board upon having safely passed what I think was justly regarded as a dangerous ordeal. I mean that challenge and trial of the theory and principles of the organization of this Board in their relation to the principles of the common law, and the theory of its familiar administration, which had been foreseen to be inevitable.

It was a question of doubt with some friends of sanitary reform, and of grave solicitude with all, in view of the results of an elective judiciary, whether the great principle and scope of the right of trial by jury, interpreted under the influence of those who deprecated all efforts for protecting the public health by limiting their lawless liberty, would leave any sphere of administration or duty for a Board of Health beyond that of mere exposure and advice; and though where restricted to so limited a sphere, a Board of Health could certainly exert a wholesome influence, it is very clear it could never satisfy public expectation, or remove the more destructive sources of disease. Without coercive power, nothing adequate can be accomplished. The Commissioners, and especially the officers connected with the Legal Department of the Board, foresaw from its organization that a severe contest in the Courts for the possession of these necessary powers was not remote; and it was expected that those whose offensive pursuits the wholesome exercise of such powers would subject to sanitary regulation would combine for common protection, and that they would attack the fundamental principles on which the Board is organized and administered.

Some reference to the development of those dangers, and to the abuses that call for Health Tribunals, will show how natural it was that such attacks should be made, and will at the same time illustrate the salutary principles upon which they have been successfully defeated, and the important positions finally maintained.

So long as a nation is peopled by a population sparsely distributed over its territory, or collected into small open villages, those sources of danger against which the protection of a Tribunal of Health is needed exist in only a small degree. Those dangers, in largest measure, originate in the filth and contagion arising from the too close contact of human habitations and of their inmates; from bringing brute animals and their excrements too near

such habitations, and from various deleterious exhalations that arise from the processes of several necessary branches of industry; and to these may be added the poisonous exhalations of soils when first brought under cultivation. It is apparent that all these causes of peril, except perhaps the last, will not have any such great influence on public health as to lead to serious results indicated by the death-rates, until the villages are expanded into cities, and the country is so thickly peopled that the mines and the mills, the manufacturers of the acids and the manures, destroying the purity of the atmosphere and of the streams, unite to increase the deleterious exhalations that arise from crowded streets, alleys and houses, and together poison to a considerable extent all that a nation eats, drinks and breathes.

Then it is that men of science, and those who have the care of the sick, discover that wounds do not so readily heal; that diseases have become more aggravated; that contagions are more frequent, and do not so readily depart; that fewer children reach years of maturity, and that annually the ratio of those who die is greater to those who live.

The need of sanitary regulations is then generally felt and unacknowledged. Health laws of a more comprehensive and stringent character are enacted, and more vigor is infused into their administration.

The progress of Sanitary reform is, however, generally greatly delayed by the fact that dangers to public health are, for the most part, not so tangible nor so readily detected, and are more the subject of honest dispute than the other dangers against which law and administration are designed to afford redress.

Men skilled in science and medicine disagree, not merely as to diseases and the best means of their cure, but also as to their causes, and as to what are the nature and sources of deleterious exhalations, and how they should be prevented.

And when these questions are so far settled that the legislator is enabled to enact proper legal provisions for protecting the public health than another distinct class of difficulties arises. I allude to the claim sure to be made that that such laws infringe natural rights, and long established legal principles and analogies. For I presume it is the fact that long before any nation enacted any adequate laws for the protection of public health, its laws, relative to the general rights of persons, to the conduct of business, and to real and personal property, have reached a considerable degree of completeness and certainty. The laws of Judin, for example, as set forth in the *Code of Menu*, nearly contemporary with the earliest Hebrew writings, have great fulness and certainty in respect of the rights of person, property and business pursuits, and yet scarcely contain a provision indicating that any real knowledge was possessed of even the fundamental principles of Sanitary knowledge or administration.

The Roman Codes illustrate the same general truth, and the history of desolating disease and death in the imperial dominions declare the consequences. When those codes regulated and had for five centuries regulated

with great fulness and clearness, the rights of person and property, in the city Rome, the decision of a legal tribunal of that city that all the earthenware therein should be deposited outside of the city in a huge pile, visible to this day, was the proscription which the sanitary wisdom of that age made against a desolating pestilence.

When, in 1848, the first comprehensive Health Law was enacted in England, there were but few decisions to be found in the reports of the courts upon sanitary subjects, and the elementary treatises of its great commentators alluded to the subject in scarcely a dozen lines. The following is the substance of all Blackstone had to say, viz. (Vol. 4, p. 161): "Offences against the public health, a concern of the highest importance, and for the preservation of which there are in many countries *special magistrates appointed.*"

He says: "A person afflicted with the plague may be commanded by the mayor to *keep his house*, and if he disobey, the order may be enforced by the watchman," &c.

And he states that ships having sick on board may be compelled to perform quarantine.

As in this country the subject is about as briefly disposed of by Chancellor Kent. Yet, in both countries the laws relative to personal rights, to all kinds of business relations, and every species of property were precise, voluminous and certain.

When, therefore, the Health Laws of England, inspired by those scientific and philanthropic investigations into sanitary science which have so strikingly marked the last quarter of a century, swelled into a large volume, and their execution became at once the most interesting and the most salutary portion of the administration of the State, it was found that the laws and the reports were barren of precedents, and that a new and vast field of judicial activity was opened.

Those engaged in pursuits that sent deleterious exhalations into the air in cities and villages; those who daily poisoned the pure water of brooks and rivers, and filled the public sewers with fetid matter; those whose crowded shops and tenement houses were the prolific sources of contagion and death; those who vended in the streets and in the shops nostrums more fatal than any diseases they were intended to cure—all those found a new force in the public administration, and felt a necessity for just obedience or for effectual resistance.

And since the enactment of the Health Law of 1866 in this State, the same force and necessity have been felt here. It was natural that combinations should be made, and that the new force should be resisted. It was not strange it should be said that there were no precedents, and that no wholesome health regulation could be enforced, except as sanctioned by a trial by jury. This rule was demanded under the claim that no such evil could be removed by any coercive process unless it was a common law nuisance, and that, if it was properly designated as a *common law nuisance*,

the right of trial by jury was guaranteed to the party by the Constitution of the United States.

On the part of the friends of sanitary reform it was claimed, and thought to be true, that no adequate sanitary precautions could be enforced in the thousand particulars in which they are needed in a great and crowded city, if in every instance a nuisance must be proved, and trial by jury could be demanded. It was claimed on your behalf that reasonable precautions for the protection of the public health was a part of *the general police power of the State, and not legitimately the subject of individual litigation*, unless it was proposed to appropriate or destroy property, and that a proper regulation of the manner of closing certain classes of business that were dangerous to the health of all, was neither the destruction of a business nor the impairing of any of the rights or privileges of property or pursuits, in such manner, or to such extent, as to give any claim for compensation, or create any right to demand a jury trial. It was a question of general regulation affecting the safety of the people, and not a question of local nuisance, any more than a regulation preventing the building of wooden houses in a city.

Thus the general claims of each party arose which were referred to in my last report, and which really involved the serious question whether, under our Constitution and Laws, there could be created and maintained a Health Tribunal with anything like adequate powers for the protection of the people, especially of the poor and the feeble classes, against the thousand sources of danger to life and health which originate in a dense population and a reckless disregard by the rich and the powerful of the safety and comforts of others. From the extensive litigation that arose, certain cases involving the great principle alluded to were selected and carried to the highest Court in the State, with a view, as far as possible, to settle those important questions; and the result has vindicated the position and general authority of this Board, and the questions discussed and decided are of such public importance that I deem it proper to state the leading points raised and decided in those cases. They are—

(1.) That it was within the Constitutional power of the Legislature to create a Board of Health, the members of which should be nominated by the Governor, and confirmed by the Legislature or Senate.

(2.) That such Board had the power to pass ordinances, reasonable and proper to be observed for the protection of life and health within the Metropolitan Health District, and that the penalty fixed by law for their violation could be recovered.

(3.) That the Board had authority to make proper orders for cleaning premises, and for removing causes that made nuisances by endangering the public health, &c., as the law provides, and that such orders could be enforced.

(4.) That such orders, (reasonably made,) do not take private property for public use, or destroy or impair property or business, in any such sense as gives a right of compensation or of trial by jury.

(5.) That the Courts have no right to ignore the action of the Board, whether by orders or ordinances, and to enjoin the action of the Board without the record of its action being before the Court for review; and that before the action of the Board can be set aside, it must be made to appear that it exceeded its discretionary jurisdiction, or abused it through recklessness, bad faith, or for other indefensible reason.

(6.) That the action of the Board, both by order and by ordinance, against slaughtering and cattle driving in densely populated portions of the city of New York, was in all respects legal and proper, and it was sustained by the decision of the Court of Appeals in each of the four cases carried to that court.

Thus it will be seen that while the Board is declared to possess adequate powers for the important purposes for which it was created, it is at the same time subject to that species of judicial supervision which will be a protection against any attempt to exercise unwarranted authority.

Notwithstanding those decisions had vindicated the power of the Board, there were pending numerous cases relative to slaughter-houses in the city of New York, in which further litigation was possible, though with no doubtful final result. The impatient spirit of the community, justly indignant that more than a hundred places should exist in the densely populated portions of the city of New York, where the public slaughtering of dumb beasts should be conducted by night and by day; and to which, through the public streets at mid-day, the half-domesticated bullocks of Texas and Minnesota should be driven, to the great peril of the people, demanded that the Board should promptly, and to the fullest extent, exert its discretionary power by at once closing all these places of slaughter; but the Board could not be unmindful that these prolific sources of disease and danger had existed for generations in the midst of the people of this city; that a useful class of men had invested large sums of money in the business of slaughtering; that many, and perhaps most, of the proprietors had been confidently advised, and had honestly believed, that the decision of the Court of Appeals would be in their favor, and that they had therefore continued their pursuits until the decisions had been announced; and that while large provisions had been made for doing slaughtering in vast abattoirs by greatly improved methods, and at points beyond the densely populated portions of the city, there was yet much to be done to prevent the removal contemplated being needlessly expensive and inconvenient.

Besides the heat of the summer, when slaughtering is most detrimental to the public health, was past, and a delay in the removal for a brief period would not be likely to be attended with any serious consequences, especially as the butchers gave the fullest assurance that the business should be conducted in the least offensive and most cleanly manner possible until removed. It was moreover made quite clear that by the first of January, 1869, complete arrangements and adequate accommodations would be completed for doing all slaughtering above Fortieth street, and in large establishments on the shores of the Island, mostly on the east side.

And as further litigation and angry feelings, based on alleged injustice, were sure to follow any order of the Board for a removal of all the slaughter-houses at once, and such order might not be executed till after some delay caused by further litigation; and as it was believed that a reform secured by satisfying as far as practicable the objections of those whose business would be most embarrassed by it, would be far more salutary in its effects than one produced by coercion alone, the Board decided to give the butchers a period of about three months in which to complete their arrangements, and to make a removal to the points selected above Fortieth street. To the reasonableness of this determination, it should be recorded to their credit that a large portion of them cheerfully assented, and by order the Board declared that no slaughtering or cattle driving should be conducted in the parts of the city below Fortieth street, in the city of New York, on or after the first day of January, 1869, so that all the butchers were required and will be compelled to make the removal by that date. In the meantime, ample erections have been nearly completed at the points selected, and there can be no reasonable doubt that the order will be fully complied with by the first of January next.

Thus, after a persevering and laborious effort of this Board, continued through a period of more than two years and a half, and conducted in the courts and in the Legislature, against the most formidable and determined opposition, will be secured the greatest sanitary reform ever effected in this country: a reform that removes from amid densely populated districts about one hundred and fifty places of slaughter, with all their brutalizing exhibitions and dismal bellowings, all their decaying accumulation of offal, and streams and pools of blood, putrefying in the sun upon the streets, or sending forth poisonous exhalations from the sewers; all the terror, wounds and death that result from droves of half domesticated bullocks being driven at mid-day along crowded thoroughfares.

There can be no doubt that this reform, more especially in the districts relieved and so densely packed by the poor in their narrow, ill-ventilated abodes, will materially lessen the perils of infancy and disease, and will take from the rates of death, while it removes a demoralizing and brutalizing spectacle, heretofore daily witnessed by thousands of children from the windows of hundreds of tenement houses, which has hardened their hearts for deeds of crime and death.

The change will also, by compelling the business of slaughtering to be conducted by more scientific methods, and in a few large establishments, cause meats to be better prepared, and render practicable that more careful and complete inspection which will be a safeguard against unwholesome meats being exposed in the markets.

There could be no doubt but this great and salutary reform alone is worth all the cost and all the self-sacrificing exertion demanded by the creation and administration of this Board.

The general administration of the Board, as to my department at least,

has been conducted in an efficient and satisfactory manner during the past year, the details of which will be found sufficiently stated in the report of the Attorney. The provisions of the Law of 1867 have been found to be quite effective ; and the authority and usefulness of the Board has become so generally recognized that, more and more, its action is acquiesced in, *because the Board has seen fit to take it and it is felt to be just salutary*, rather than because the Board has the legal right and duty of causing it to be obeyed. And there can be no doubt that the recognized oversight of the Board, in respect to all matters prejudicial to the public health, quite independently of any action taken, has operated as a great restraint upon those who would otherwise do or allow that by which the public health would be endangered.

D. B. EATON,

Counsel Metropolitan Board Health.

“C.”

OFFICE OF THE ATTORNEY, METROPOLITAN BOARD OF HEALTH, }
NEW YORK, November 1st, 1888.

To the Secretary of the Metropolitan Board of Health:

While, during the past year, much labor has been performed in my department, little has occurred to call for particular report. The litigation connected with the attempt of the Board to drive the slaughter-houses from the thickly settled portions of the city, involved very great labor. The final decision obtained in the Court of Appeals, by vindicating the views of the powers of the Board, which were from the outset taken by its legal advisers, has, however, greatly facilitated the conduct of its business. Indeed, all serious or combined resistance to its authority has ceased, and no difficulty is found in enforcing either its orders or its ordinances. The history of the slaughter-house litigation is given by the Counsel in his report.

Since my last report, and especially since the decision of the Court of Appeals, the Board has adopted to a much greater extent than previously, the policy of abating nuisances by means of suits in the court to recover penalties for violations of the law, or of its orders or ordinances. This policy has been found most successful. Owners of real estate previously, in many cases, neglected the orders of the Board, and allowed it to do the work commanded, while now a suit promptly brought for the recovery of a penalty stirs such persons to immediate action. The enforcement of the provisions of "the Tenement House Law," so-called, is by that law made to depend entirely upon suits for penalties. The course which has now been adopted, as to violations of this law, is as follows: When the report of an Inspector is received showing a violation, it is at once laid before the Board, and a direction to commence a suit is obtained. Notice of this fact is then given to the owner or lessee, and he is allowed fifteen days in which to remedy the evil complained of. If more time is needed, it is granted on application. If, at the end of the time, it is found that the evil has not been remedied, an action is at once commenced in one of the District Courts. The judgment demanded is always one hundred dollars, but in practice the amount taken varies greatly with the circumstances of each case. At first many suits were discontinued without any payment, as soon as the law was complied with. Subsequently the rule was made to require the payment of costs, and now the highest payment demanded is thirty dollars. This seems enough to enforce obedience to the law,

while it is not oppressive. In at least three-quarters of the cases the evils are now remedied before suit. No case is settled unless the remedy is applied. The number of cases under "the Tenement House Act," in which suits have been ordered within the year, is 3,339 in New York, and 417 in Brooklyn. The number actually brought is 979. Of these 794 have been disposed of and 185 are now pending. Most of those pending will be disposed of within the next fortnight, final action having been delayed in consequence of the confusion caused by the removal of the court-room of the Sixth District Court, in which all the actions have been brought, and where, it may be said in passing, Justice Lane has most efficiently seconded the efforts of the Board.

Suits have been directed in 421 cases of non-compliance with orders on premises situated in New York, five in Brooklyn, four in Richmond county, one in Queens county, and forty-one in Westchester county. The number brought is forty-seven, of which forty-three are pending and four have been disposed of.

Ten actions have been brought for violations of the Code of Sanitary Ordinances, all of which remain to be disposed of. One of these is against a physician for incorrect returns of deaths. I have tried earnestly for three months to dispose of it, but have failed.

The difference between the number of suits brought and those ordered brought, shows approximately the number of instances in which notice of intended suit led to a speedy compliance, though in some cases no actions were commenced because the proper parties could not be found.

The litigation which was pending when my last report was made remains unchanged. The cases relating to the markets have been reached, but not tried, owing to the restraining force of the act of the Legislature of 1867. The demurrer in the case of the Idaho, argued before Judge Daly, of the Court of Common Pleas, on May 14th, 1867, has not been decided by him. I presume, from the length of time that it has been retained under consideration, we may soon expect a learned and elaborate opinion.

There has been paid to the Treasurer for penalties, collected by suit, the sum of \$941.39. This is the net amount after considerable deductions for expenses. At least a thousand dollars more will be paid over within a fortnight. I think it safe to say that a sum nearly or quite equal to the ordinary law expenses of the Board, will be hereafter repaid by the penalties collected, if the present policy is pursued. Since March last, all sums collected in actions, whether for costs or otherwise, are paid over to the Treasurer, the Attorney being paid wholly by a salary and receiving no costs.

On the 30th day of June, 1868, an assistant attorney was appointed, who took charge of all matters arising in Kings county, relieving me from all responsibility therefor.

Liens for work done by the Board have been filed against 215 lots, for an aggregate sum of \$14,070.73.

The experience of another year strengthens my conviction of the desirability of some provision for the service of notice upon the unknown owners of premises where nuisances exist, and for authority to remove nuisances common to the lands of many owners, or which can only be removed by entering upon the lands of other persons than those upon whose land the nuisance exists.

Your obedient servant,

GEORGE BLISS, JR.,

Attorney Metropolitan Board of Health.

“D.”

OFFICE OF THE ENGINEER METROPOLITAN BOARD OF HEALTH, {
New York, November 1, 1882. }

To the Secretary of the Metropolitan Board of Health:

The complaints submitted for my endorsement, and the orders for execution in my department have been of the same general character, but less in number than in former years. There has been a gradual improvement in the sanitary condition of the District, premises have been kept in much better sanitary condition, and parties have complied with requests and suggestions of Inspectors, without recourse to complaints or before the complaints have been endorsed, or have promptly executed the orders when served. Nine hundred and fifty-five (955) orders have been referred to me for execution; of these six hundred and fifty-eight (658) have been returned to the Sanitary Superintendent as “complied with.” One hundred and sixty-three (163) have been executed at a cost of \$13,654.36. Seventy-one (71) have been recommended to be cancelled, and sixty-three (63) have been returned to the Sanitary Superintendent for prosecution for noncompliance. It will be observed that the larger portion have been complied with, that is, the work has been done by the parties in interest.

On the receipt of an order for execution, the premises are invariably inspected by the Sanitary Police officer, Mr. Brady, detailed to my department. Many have been found to be complied with before this inspection; if not, report is made to me of the condition, and when the same parties have had orders served on other premises, and have complied with such orders, or shown a disposition so to do, notice has been sent to them to come to my office, and they have almost invariably complied with the request, and have cheerfully abated the nuisance.

When there has been any doubt as to the proper manner of executing an order, I have personally inspected the premises with the party interested, and if the order could not be complied with to the letter, I have suggested how it might be done satisfactorily, sometimes obtaining permission of owners or occupants to enter and work on adjoining premises, or to connect with their sewer, when no readier means of doing the work could be found. It has been the aim of my department to abate nuisances in the promptest and most effectual manner, and with the least possible expense. The experience of the last year has brought not only a knowledge of premises, but of owners and parties in charge, and the result has been that our work is now better done, and to the greater satisfaction of all parties concerned. While the number of complaints and orders has been reduced

from year to year, the increased number of inspections and reinspections, and the more careful recording of the work done, have increased the duties of my department, and two inspectors and one clerk have been necessary through the fall and summer months.

I am more fully impressed than on my first acceptance of the office of Engineer, that there can be no structural remedy which can make clean the premises of persons who are persistently dirty. Yet, by proper appliances, by giving the better disposed the necessary facilities, by the influence of example, and by so arranging houses that each family can be held to its own share of responsibility, great reforms may in time be effected. The system of frequent inspection by Sanitary officers of tenement house property, the requirement that the authority over, or charge of, premises be given to one party, and if possible, that each family have a separate water-closet, and means of ventilation distinct from others, would greatly improve the sanitary condition of this class of dwellings.

In my previous report I have adverted to cheap plumbing, and the injury that may result to health from carelessness in this particular. I had also the impression that the sewer smell might pass through the water seal or trap, by absorption on one side and giving off on the other, or that the water might evaporate from the trap. Although there might be cases in which either of these results would occur, and there can be no injury in often renewing the water, yet, from recent experiments, it does not seem important. Some fifteen months ago I had a trap put in the sewer-pipe beneath the Police Headquarters, entirely shut up and distinct from any service. For some months I did not find that there was any perceptible smell, or that the water, tested by the acetate of lead, gave any trace of sulphuretted hydrogen, or that there was any evaporation; and now, after a lapse of fifteen months, I find that there is still no smell or evaporation sufficient to destroy the seal. Still it is within the experience of every one that houses often become offensive from sewer smell, which cannot be accounted for, but which is probably due to some minute leakage. I would suggest that in plumbers' specifications architects should require a two-inch seal, and make such provisions that all the work should be tested under an inch and one-half water pressure. In putting in a gas service-pipe a pressure test is always applied.

Sewers and Sewer Connections.—The Croton Board and Brooklyn Board of Sewers have, during the past year, been working with great vigor, and as far as their departments are concerned, have contributed their share of sanitary improvements in matters of drainage. As fast as the sewers have been built, both in this city and Brooklyn, your Inspectors have followed with requests for connection therewith for the drainage of houses and stagnant water. Of the latter, many such nuisances have been abated in the upper part of the city, and in the Sixteenth ward of Brooklyn. In New York the estimated amount of all sewers that will have been laid the present year will be (93,000 feet) ninety-three thousand feet, at an estimated

cost of about (\$451,000) six hundred and fifty-one thousand dollars; and in Brooklyn thirteen and one-quarter miles at a cost of about two hundred and eighty thousand dollars (\$280,000).

The following is the exhibit of the revenue derived from permits for sewer connections in New York:

January 1, 1861, to December 31, 1861	\$15,981 00
January 1, 1862, to December 31, 1862	14,193 00
January 1, 1863, to December 31, 1863	16,169 00
January 1, 1864, to December 31, 1864	15,375 00
January 1, 1865, to December 31, 1865	16,393 80
January 1, 1866, to December 31, 1866	29,775 50
January 1, 1867, to December 31, 1867	47,895 50
January 1, 1868, to November 1, 1868	28,363 00

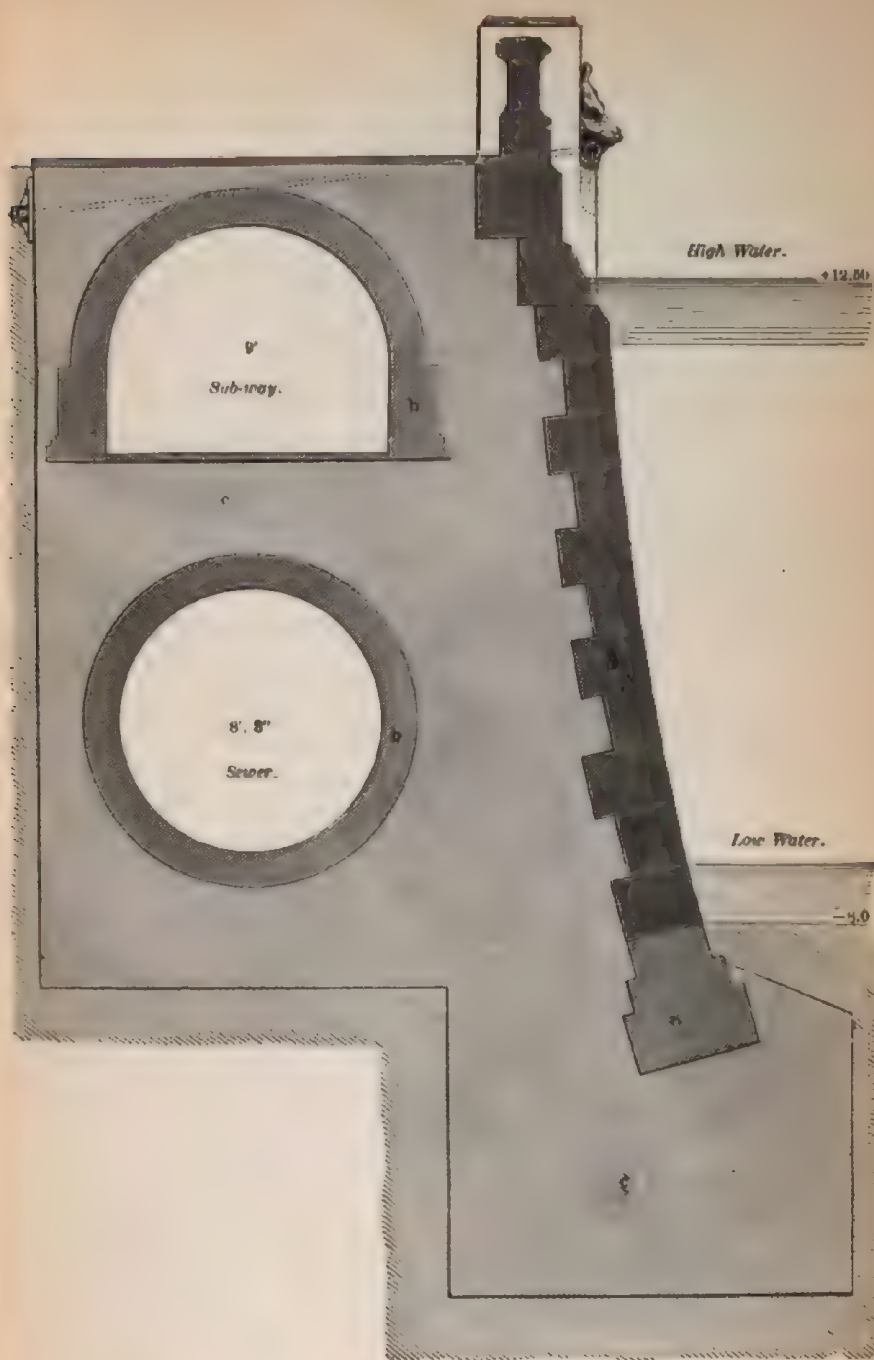
Number of connections made with sewers in Brooklyn.

1859	422
1860	1,696
1861	4,895
1862	3,168
1863	1,948
1864	1,301
1865	1,519
1866	3,605
1867	2,922
1868, to November 1	2,768

The price of a permit in New York is \$10, which makes the number of permits in the last ten months (2,836) two thousand eight hundred and thirty-six. The permits represent every house connected with sewer, and often a number are connected with one sewer pipe, but still it can safely be reckoned that every sewer permit embraces the laying of (50) fifty feet of sewer pipe on the average. The quantity of sewer pipe laid this year in New York exceeds (27) twenty-seven miles of (6) six inch diameter; and about the same quantity in Brooklyn.

In Morrisana some progress has been made in drainage. The construction of two sewers has already been contracted for, and arrangements have been made for a survey and mapping out of the town for a general system of sewerage. At Edgewater, Richmond county, a survey is also in progress for the same purpose; but it is still to be regretted that in populous and wealthy districts, there is no general act by which lands can be reclaimed from malaria, and that a single owner can prevent a drainage that would be of mutual benefit to himself, his neighbors and the country generally.

Under the Tenement House Act, little has come into my department except a few cases which have been referred to me by the Attorney for



SECTION OF THAMES EMBANKMENT, LONDON, ENGLAND.



inspection. The Act is, in most respects, good; but it is not sufficiently definite on ventilation. It seems to me that any system of ventilation which destroys the privacy of apartments, which makes an opening between the sleeping apartments of different families, or even with those of the same family, is open to decided objection in a moral point of view. Ventilation should be effected by a distinct flue to the outer air, rather than by window openings, which make the apartment as it were but one.

There have been the usual complaints of wet cellars, and of water running from one premises into another, the source of which could not be accurately traced. In investigating these complaints, although there seemed to be no power to dig for the purpose of discovering these sources of water, we have invariably had the assistance and permission of the tenants or owners of premises, and the parties at fault have applied the remedy, although not ordered so to do.

When an unoccupied lot is on level above the cellar of the house adjoining dampness will almost invariably show itself on the wall, especially if the mortar is poor. In these cases permission has been secured for the parties owning the houses to enter the adjoining lot and plaster the outside of wall with cement, and the result has proved remedial. It would save parties building in this way considerable trouble, would they paint the outside of the wall beneath the soil with a coat of asphalt.

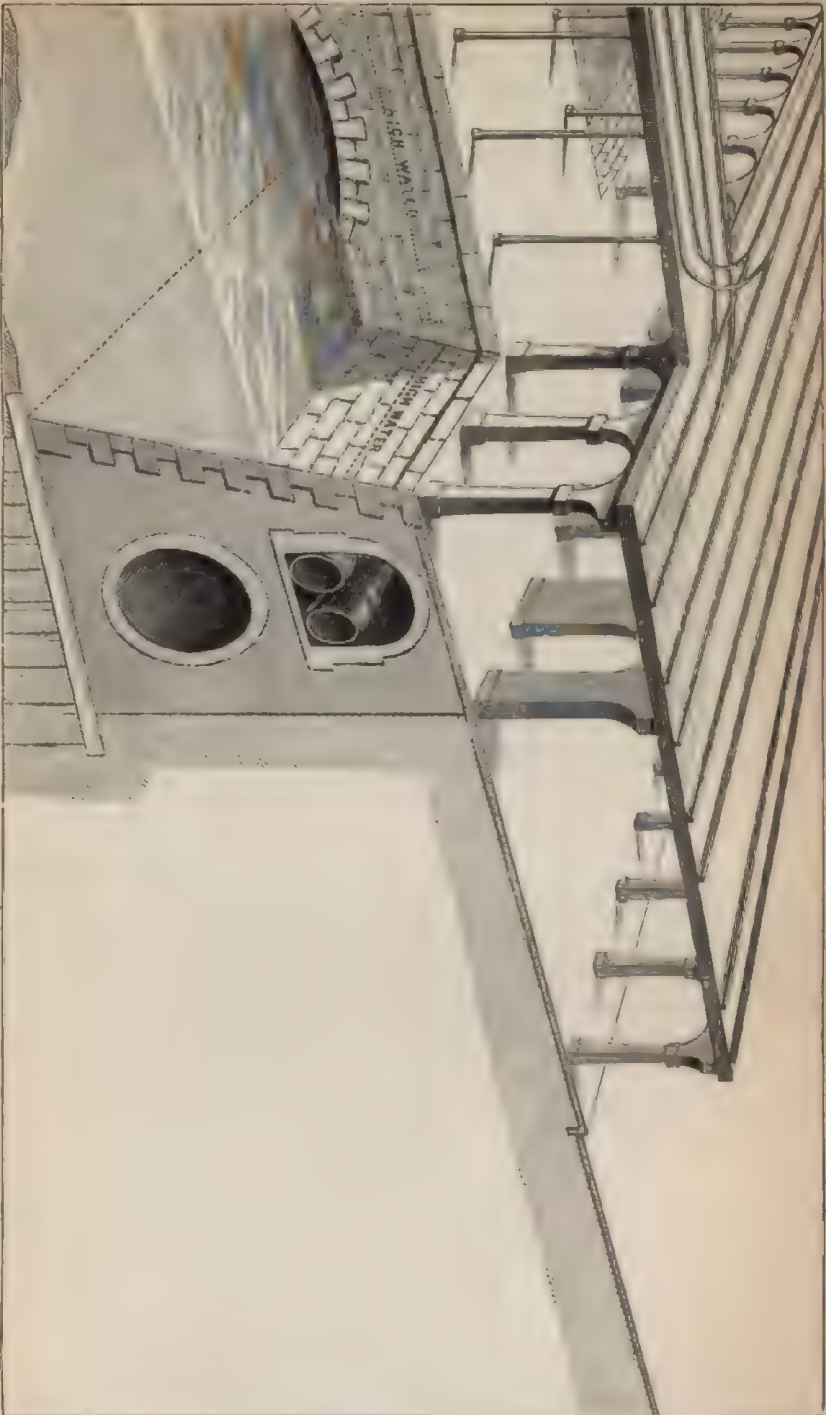
On cellars along the rivers subject to flowage by tide, few orders have been issued; some occupied by tenants have been ordered to be filled or kept bailed out; but a radical change should be made in sewerage to make these available for any purpose. In former reports a belt-circulating sewer was suggested on the model of that used in London. The subject I consider so important that, without trespassing on the province of the Croton Board, I offer some sketches and suggestions of how this might be carried out without much expense to the city, and to the manifest improvement in commercial and transit facilities. The accompanying drawing represents a section of the Thames Embankment. It consists of a wall of concrete faced with granite ashlar, with a circular sewer in brick work, and a sub-way for the sewerage carts, &c. Provision is made by a penstock or basin at the mouth of each branch sewer, by which when the storm water fills the basin above a certain height it overflows and discharges into another chamber, which communicates with the river by inclined flap-gates opening under a superior inside water pressure. Such a sewer built along the bulk-head line of the North and East river, and discharging into settling basins or reservoirs beneath the Battery, from which the water would be discharged by steam pumps into the river, would reclaim a large territory, and make valuable for commercial purposes basements and cellars along the river fronts, portions of Centre, Canal, Ferry streets, and West Broadway and their vicinity. The sewer I would propose would be similar to that of London, but with such additions as would be important for the interests of our city. A sketch is submitted of that proposed for the lower part

of the city; in the upper part less size of sewer would be requisite, and in many cases less depth of water at bulkhead. Top of wall five (5) feet above high-water mark; depth of water twenty feet. Partly supported by the wall, and raised some sixteen (16) feet in the clear above the level of the street, there are four (4) lines of railway, the two (2) inner ones intended for passengers, the two (2) outer with branches on the pier for freight transportation and distribution. An arch thirty (30) feet span is to be thrown from the bulkhead to the piers, so that in every case there may be a current along the bulkhead line to break up the present cesspool system of wharves and piers. The sub-way should be used for water and gas mains. Retaining the present gas holders, there is no reason why the gas might not all be manufactured at the upper extremity of the Island and distributed throughout the city, four (4) foot mains would be ample for present purposes. A water main of same diameter on each side of the city would improve the water supply of the lower part of the city, and enclosed in masonry they would be of easy access. Of the cost of such work it is impossible to make anything like an accurate estimate, without thorough investigation of the bottom by soundings. In some places the foundations would be on piles, in others rock or gravel; all should be executed with coffer-dams, and there would be in many cases considerable obstruction from old material. The masonry can be readily estimated. The following are the figures given me by one of our largest contractors:

2.8 cubic yards pitched ashlar, \$30 per yard.....	\$84 00
2 cubic yards brick masonry, \$15 per yard.....	30 00
8 cubic yards cement, \$9 per yard.....	72 00
	<hr/>
	\$186 00

This quantity is for one running foot, and as per sketch.

How such an important work can be undertaken there must of course be some diversity of opinion; but of its importance and advantages, both from sanitary and commercial points of view, there can be no doubt. The business of this city can only be limited by facilities in transacting it, and with the constant increase of travel, the right of way for the railroads ought to bear the expense of the permanent work, if not of the pumping. With provision for the discharge of the water of large showers by flap-gates the flow through the sewer will not much exceed the water supply, now estimated at 60,000,000 gallons per day, if the discharge be reckoned at 100,000,000, per annum, the entire cost of pumping (on the basis of the cost at Ridgewood Engines, Brooklyn Waterworks, for the last six years) will be \$82,000 per annum—a very small percentage on the rental of property improved. In carrying out so large a scheme, after thorough examination of the ground, there might be some variation in detail. Another line of intercepting sewer might be thought better, and another



VIEW OF BULKHEAD AND RAILWAY, PROPOSED FOR NEW YORK CITY RIVER FRONTS.







11TH AVE

12TH AVE

VIEW OF PROPOSED NEW YORK CITY MARKET,

opening with the river at Manhattanville; but the general plan is not only not novel, but eminently practicable and useful.

Markets.—The Legislature of 1866 passed a resolution requesting a report from the Board of Health on Markets, and the recommendation of some plans, which was referred to a committee, for whom plans were drawn showing the comparative space occupied for markets in the city, and for the *Halles Centrales* of Paris, and how inadequate are our accommodations in comparison with those of Paris. The latter are placed in nearly the central part of the city, and deeming that this might also be the best location for this city, I therefore carefully determined the centre of population from the records of the last census, on the principle of determining the centre of gravity of solids, and found it to be at the corner of Tenth street and Fourth avenue. I therefore recommended a great extension of Tompkins Market, but it seemed to your committee that some location on the North river would be in every way more convenient; and an elevation was made, of which the accompanying is a sketch, and forwarded with report to the Legislature.

The following is from the description in my report to the Committee:

"The space covered by the building extends from Eleventh avenue on the east to the line of bulkhead, and over pier and pierheads, and on the line of avenues four (4) full blocks. A block to the north and south are left vacant for future extension. The blocks are covered with buildings of but one story, with ample skylights over each double line of stalls. The streets, Twelfth avenue, piers and pierheads, to be covered by two story erections; first story open spaces lighted by side lights. Ample provision is thus made for the sheltering of market wagons, and large pier accommodations is given for barges, propellers and market boats of every description. There will be no proper basement, but sufficient cellar accommodations will be provided beneath the stalls which are to occupy the first floor; the upper floor at present to be used chiefly for the storage of roots, fruits, butter and cheese, with central tracks throughout for their reception and distribution; the attic or roof stories to be used for the preservation of fresh fruits, as now practiced in some of the western cities. It is intended that this market should be for all kinds of produce, and contain *aquaria* or tanks for the preservation of fish alive. It has been urged that it is impossible to keep salt water fish alive in the North river, and that consequently this department must be retained in the East river, as there is too large an influx of fresh water down the Hudson. The police boat having been placed at my disposal, an investigation was made of the comparative saltiness of the top and bottom of the North river. The report of Prof. Chandler, hereto annexed, gives the result of his analysis at different points, by which it will be seen that the water at the bottom of North river contains more than three times the weight in grains of salt per gallon, that is contained in the water at the top, and is fully as salt as the top water in East river. By the use of tanks and circulating pumps, drawing their

supplies from the bottom of the river, and well out in the stream, there will be no difficulty in keeping fish alive, but also healthy, in water free from the contamination of sewers, docks and gas-house waste. Fresh water supply can be drawn from the water strata of the Island, which is ample and good until vitiated by privy and house-waste soakage. To supply water for cleaning and washing; to drive the pumps; to afford power for hoisting from barges and to the upper stories; to provide means of ventilation for cold preserving in rooms, and for the markets generally, two steam engines will be necessary."

Life-Saving Apparatus.—Owing to the frequent loss of life within this District by drowning, the Board directed the Sanitary Committee to provide some life-saving apparatus, which has been prepared by me under their direction, and distributed over thirty-eight (38) stations in New York, Brooklyn, on Staten Island and at Yonkers. It consists of a light ladder twelve (12) feet long, twelve (12) inches wide, with (15) fifteen feet of rope attached. An ash pole fifteen (15) feet long, with three (3) pronged hooks and stub-pike at one end, and an eye at the other. A rope is attached to the hook, and passing through the eye is left with a slack of twelve (12) feet. A cotton rope 150 feet long, with a nine (9) ounce wooden buoy at one end, and a three (3) pronged grapnel at the other. The rope is hung in coils in a box, in which is also placed a phial of ammonia; directions for resuscitating accompany every apparatus. With the apparatus last sent out the length of the rope has been reduced to one hundred (100) feet, as this is the extent to which the grapnel or buoy can be thrown, and the longer line is apt to get entangled.

Urinals and Drinking Hydrants.—An appropriation was made for the establishment of drinking hydrants and urinals. Under this appropriation one hydrant has been put in at the corner One Hundred and Sixteenth street and Fourth avenue; and drawings have been made for two public urinals, one at Astor Place and one at the corner of Broadway and Park Row. But as the appropriation will not be sufficient for the building of both, the Board has directed the execution of the first only, which has accordingly been put under contract.

Respectfully submitted

W. E. WORTHEN,

Engineer, Metropolitan Board of Health.



Work performed under orders issued by the Metropolitan Board of Health.

Number of General orders received from Metropolitan Board of Health...	12,679
Number of General orders served.....	11,891
Number of General orders complied with (no service).....	788
Total.....	12,679
Number of General orders complied with by owners.....	7,606
Number of General orders complied with (no service).....	788
Number of General orders not complied with and returned to Sanitary Superintendent	4,285
Total.....	12,679
Number of Special orders received from Metropolitan Board of Health...	1,261
Number of Special orders complied with (no service), and returned to Sanitary Superintendent	8
Number of Special orders no cause for complaint	1
Number of Special orders served and returned to Sanitary Super- intendent for reinspection	1,252
Total.....	1,261
<i>Number of Privies cleaned, Dead Animals removed, Unsound Meat, Fish, &c., seized and removed from the City Limits.</i>	
Number of privies and water-closets cleaned	12,993
Number of loads of night-soil removed	46,947
Number of dead horses removed	4,251
Number of dead cows removed	198
Number of dead goats removed.....	217
Number of dead sheep removed	286
Number of dead hogs removed	277
Number of dead dogs and cats	4,815
Number of dead calves, "bobs," removed.....	250
Number of dead bears removed	1
Total.....	10,295
Unsound veal, pounds removed	40,592
Unsound mutton, pounds removed.....	53,502
Unsound beef, pounds removed.....	49,024
Unsound pork, pounds removed	4,612
Unsound fish, pounds removed.....	90,250
Unsound poultry, pounds removed	9,992
Total	247,972
Unsound eggs removed, barrels	21
Number of barrels of offal removed	74,455

"F."

Report of Investigations RELATING TO THE TEXAS CATTLE DISEASE, WITH REFERENCE TO CERTAIN PRACTICAL QUESTIONS IN HYGIENE.

METROPOLITAN BOARD OF HEALTH, }
NEW YORK, 1868.

To the Sanitary Committee of the Metropolitan Board of Health:

The investigations that were committed to your direction in regard to the infectious disease in beef cattle, by the Metropolitan Board of Health, are now so nearly terminated that it becomes a duty to report to you the results which have been reached in the inquiries that you placed under the writer's supervision.

In presenting this report, the superintendent of the work feels that it is due to your committee, and especially to the medical officers who have been engaged in these researches, to state that this duty was undertaken at a period when each of us was burdened with an unusual amount of work, and that whatever may appear in the report to be incomplete and too meagre in the record of details or circumstances concerning these labors, might justly be charged to the excessive demands that were made upon our time, as well as to the new and difficult nature of the investigations. And, in addition to this, it is proper to remark, in this introductory paragraph, that these investigations were at first undertaken and subsequently carried forward—step by step—wholly from a consciousness of the duty which was due to the Board of Health, and by the Board to the public; and that if the Board could have found the means to employ more aid in this work, your committee would now be able to present at the conclusion a more complete report.

The exigency was instantaneous, and the duty of making an investigation in the interest of the public health and of sanitary knowledge was obvious; but until the nature and extent of this remarkable infection in

the herds that supply our markets had become known, it was not certain that the results of these investigations would warrant the scope and cost of them, unless the labors were voluntarily assumed by medical men who were already in the Board's service. The possibility of prosecuting any exact and trustworthy scientific investigations depended, practically, upon the willingness of medical officers to make considerable sacrifices of time and toil; and it is due to them and to the Board that the fact should here be stated, that the hope of making these investigations contribute something to hygienic and medical knowledge, particularly in regard to pestilential fevers, continued to inspire and sustain these labors after all danger of the sale and use of the diseased beeves had passed. The medical profession and sanitary authorities will bear witness that this hope has not been disappointed.

Practical difficulties in conducting such investigations unfortunately deter Boards of Health and individual observers from attempting to make their inquiries systematic and comprehensive; and it has been found impossible to make all branches of these inquiries in New York as complete as the requirements of exact investigations demand. This is especially true of the medical observations upon symptoms and tests of the disease in its various stages. But whatever observations were possible during the brief last stage of the disease are put on record in this report. Great difficulties were experienced by the committee of investigation in reaching the diseased animals, and providing for the killing and dissecting of them. So sudden was the onset of the obvious or fatal stage of the malady that this circumstance is found to have effectually defeated the attempts of many of the best sanitary officers in other places. It has been easy to find and examine dead cattle, but difficult to bring medical observations to bear upon the living, and upon the condition of the organs and tissues at the moment of death, and before any post mortem changes could occur. It is this latter feature of success that gives special value to the results reached in the Metropolitan District.

The requirements of the present advanced state of pathological and and hygienic knowledge demanded that whatever investigations we undertook in this matter should extend beyond the merely superficial and obvious phenomena and appearances, and that so far as possible, the methods and purposes of each line of inquiry should be exact, searching, and strictly in accordance with the requirements of the sciences whose aid should be invoked in the work. It was also known to us that the Metropolitan market, being the natural terminus of the great railroad route for such herds of infected beeves as might be hurried forward by the unfortunate holder of them—true to "the commercial instinct to make whatever salvage he can," when an incubating poison threatens inevitable destruction to his cattle and his fortunes—the opportunity and public duty of making faithful investigations would probably be greater in New York than at any other point east of the prairies, which had become the temporary source of the disease. Experience soon confirmed the truth of this opinion.

Lest the nature of the sanitary questions, which were of predominant importance in these investigations, may be misconceived by readers of this report, the fact must be here stated that no medical officer presumed that the Texas Cattle Disease would reproduce itself in the human family. But it was believed, and it is true, that the rapidly and utterly putrefactive effect of this disease in its fatal stages clearly pronounce upon the unfitness of such dying cattle for human food. This view of the subject did at first very energetically animate the endeavor which the Board of Health put forth to prevent such dead and diseased beeves from being sold in the markets. But it must not be supposed that the Board's officers were ignorant of the fact that some of the most deadly viruses, even those of the rattlesnake and the woorara may be taken into the human stomach without obvious harm. The point aimed at was attained, namely, to prevent the diseased and dying beeves from being used for food. The means employed by the Board in attaining this result were universally understood and appreciated. The press and the people throughout the Metropolitan District, and wherever the diseased cattle were seen, emphatically sustained and commended this action of the Board. Herdmen and agriculturists also gave their willing testimony and obedience to the mere recommendations of the sanitary officers, and are now sincerely grateful for the practical results of the sanitary regulations and the scientific inquiry relating to the disease.

In pursuing these labors, the Board's committee has sought information from every available source throughout the country, and has enjoyed the most hearty co-operation from every class of observers of the disease; and it seemed very desirable to make investigations, upon as broad a basis as possible, of general information concerning it. Such a basis has given a certain tone of trustworthiness to the Board's work that is justly a subject for the committee's gratitude. Great care has been taken to examine and analyze the mass of general and special evidence that has, by the kindness of correspondents and co-workers, come into our hands. The conclusions that are reached in this report are in harmony with all that is logically deducible from that body of evidence, though we have depended upon our own observations and the collateral researches that grew out of them.

Could the medical officers who have pursued these inquiries now consult their personal preferences, they would defer the presentation of this report until there shall have been a free interchange of the various reports by State Commissioners; but the request that this report shall be submitted without delay, is obeyed with alacrity, because both the Board of Health and the State Commissioners for the prevention of cattle plagues in New York, have expressed a desire to make immediate use of the information contained in the report. But in thus hastily closing the report, it must inevitably be marred by defects that will need to be corrected hereafter. The culture experiments upon the cryptogamic or fungus element found in the blood and bile of the infected cattle, are still in progress under the skillful hands of Dr. Stiles, the deputy registrar of the Board of Health, and of Prof. Ernst Hallier, of Jena, and will be continued as long as they may

deem it desirable. These and some other incidental inquiries, while they may eventually throw light upon the causation and concomitants of the disease, do not in any way postpone the practical conclusions and sanitary measures which State authorities need to adopt. And there is much reason to believe that every branch of the investigations which have been commenced under the approbation of your committee and of the Board, will ultimately lead to a correct knowledge of the disease, and to the utter extinction of it. If, in attaining this result, it is found that important truths are established, concerning the cause and prevention of certain pestilential diseases in the human family, the public duty of exact inquiry into the causes and prevention of all epidemic and epizootic diseases will be practically illustrated. This ultimate object of medical inquiry will not fail to be attained if sanitary officers will, in the discharge of their duties as guardians of human health, carefully observe and investigate the nature and causes of the infectious plagues that occur in those useful classes of animals which the beneficent Creator has given to man for food and service. The people who require safeguards against insidious sources of disease, will share with the herdman and the farmer such immediate and obvious benefits of the sanitary investigation and restraint of cattle plagues, as will fully repay the toil it costs, and in the end, the total results will be found added to the the sum of human happiness and healthy life.

E. HARRIS.

NEW YORK, *December 31st*, 1868.

PLAN OF THIS REPORT.

- I. A consecutive account of events connected with the appearance of the Texas Cattle Disease, and of the procedures which were taken thereon.
- II. The records of the Sanitary Inspector of the Board and Assistant Commissioner of the State, concerning the herds of Diseased Cattle that have come into the Metropolitan District.—Dr. MORRIS' Special Report.
- III. Statement of the Results sought and reached in Correspondence with other observers.
- IV. Statement regarding the chief objects of exact Scientific Investigations, the nature of the Methods adopted for attaining them, and the Results attained.
- V. Special Report, by Dr. R. Cresson Stiles, upon the Pathology of the Cattle Disease, and upon the Microscopical Researches for ascertaining the Nature and Effects of the Contagium, or Cause of this Disease.
- VI. Report of the Results of Chemical Analysis of the Blood, Bile, Urine and Liver, obtained from the Diseased Cattle. By Prof. C. F. CHANDLER.
- VII. Explanations of the Illustrations.
- VIII. With what well described diseases is this Texas Cattle Disease allied?
- IX. Remarks upon the New Facts and Demonstrations added to Physiological and Pathological Knowledge by these Investigations.
- X. Conclusions.

I. ACCOUNTS OF EVENTS AND PROCEEDINGS.

DISCOVERY OF THE DISEASE IN THE HERD-YARDS.

Early on the morning of August 8th, the Registrar of the Board of Health obtained information from a member of the staff of the daily *Tribune*, that there was believed to be a herd of diseased and dying cattle at one of the two great herd-yards near Jersey City. Certain unusual events in the progress of sudden and fatal diarrhoeal disorders, in various parts of the city of New York, in the previous ten days, induced us to make a personal investigation concerning the reported herd of infected cattle. Proceeding to the abattoir yards at Communipaw, the fact was ascertained that there were then remaining alive upon the grounds there one hundred and forty-one bullocks that arrived the previous day, consigned to J. T. Alexander, Esq., Mr. Fitch, agent, and out of which there had died, or been sacrificed because dying, two hundred and twenty-four bullocks during the trip from Homer, Ill., to this eastern terminus of the route.

Having ascertained the fact that these cattle had been shipped from Central Illinois, in apparently perfect health, only eight days previously to the visit here mentioned; that the care of that herd train had been quite as good as is usual upon railroads; that the disease began to be noticed about the second day after departure upon the route, and that between Central Ohio and the time of departure of that cattle train from Pittsburg, a period of four or five days, no less than one hundred and fifty-nine of the herd died of the disease, permission was asked and granted for examining the residue of the herd then in the yards at Communipaw. About fifteen out of the hundred and upwards that were seen appeared to be sick; and upon testing the temperature of two that were approached, the mercury in the self-registering thermometer went up to one hundred and five and one

hundred and six degrees respectively. This observation not only comported with the circumstantial history of the events above related, but of itself alone this remarkable excess of animal temperature, in the absence of any evidence of inflammatory disease, and with the pulse rapid and flickering, the secretion from the kidneys copious and blood-stained, and the gait and posture tremulous, fully warranted the conclusion that the disease there witnessed for the first time at our herd-yards must necessarily be of a pestilential nature, and that any virus or morbid poison which could cause such a malady was deserving of the most exact and careful scientific inquiry.

The peculiar circumstances of the season which had made it necessary to watch very vigilantly for all removable and special causes of acute and fatal diarrhoeal disorders among the people of the city, rendered it a duty to undertake a careful examination of the viscera and fluids of the dying bullocks, to ascertain what diseased conditions they might present. Accordingly, the Registrar of the Board requested the president of the abattoir to allow the medical officers an opportunity to make such examinations at the earliest convenient hour. It was earnestly advised that none of these cattle should be sent over to the city markets, either alive or dead. Mr. Payson, the president, took an enlightened and proper view of all questions connected with this matter, and remarked that it would be well to have the Governors of New York, New Jersey and Pennsylvania take such action in concert with the Governor of Illinois, as might lead to the proper investigation of the local sources of the disease, and to suitable restraint upon the transportation of cattle subject to it. The course pursued by that gentleman during the evening of the 8th and the morning of the 9th of August, proved how judiciously and honorably he undertook his own duty in regard to the sick cattle. To this we will presently refer again.

During the afternoon of the 8th, Hon. Geo. B. Lincoln, President of the Board of Health, in concert with Hon. Commissioner Manniere, decided to have the herd-yards, within the limits of New York city, inspected under the direction of the Sanitary Superintendent, Dr. E. B. Dalton. The circumstances and results of that inspection are mentioned in the proper place in the special report of Sanitary Inspector Dr. Morris.

Upon the return of the Board's officer from Communipaw, in the afternoon, it was deemed expedient to send dispatches to the Governors of New York, New Jersey and Pennsylvania, giving them information, and suggesting such action on their part as should at once restrain the movement of all sick and infected herds. Consequently, the president of the Board sent telegraphic dispatches to Governor Fenton, at Albany; Governor Ward, at Newark, N. J., and Governor Geary, at Harrisburg, Pa., informing them of the sick cattle, and suggesting the sanitary inspection of the transport trains and herd-yards on the railroads that enter these States from the West. The several Governors replied that the desired action would be taken.

There doubtless may have been some persons who thought that such promptitude of official inquiry and action was unwarranted by any possibilities of peril, and by all lessons of experience; and, that there may occasionally be found a man who still believes that it would have been wiser to wait, and see the results of the pestilence, and of the use of the diseased heaves as food, is not unexpected. But the public would not have excused the sanitary officers for any such stolidity and indifferent delay, nor does experience warrant the belief that it would have been safe or prudent to have delayed action. Indeed, it chanced to be true that the officer who first moved in this duty for the Board of Health, knew the history of epizootic pestilences too well to admit of hesitation and delay.*

* The following extract from an editorial leader in the *London Times* of August 28th, will now be perused with advantage, for it conveys the true principles regarding such duties, in clear and forcible language:

"As the home of the rinderpest is on the steppes of Russia, so this American plague comes from the vast plains of Texas. Now, it appears that during last May and June some fifteen thousand cattle were slowly driven from Texas to Illinois, feeding on the prairies as they passed.

From Illinois, the disease spread to the adjoining State of Indiana, where thousands of cattle are still said to be dying of it, and to the city of Chicago. The next step in its progress was, that some Illinois cattle were dispatched by railway to Pittsburg, in Pennsylvania. Before reaching Pittsburg a large proportion of them perished, and others died in the Pittsburg drove yards. Thence some apparently healthy animals were sent by rail to New York, but the fatal symptoms appeared after their arrival, and within ten or twelve days after the appearance of the cattle at Pittsburg, the disease had penetrated to the northern part of New York State. The history of the development of the disease, therefore is complete. From Texas it is tracked over the prairies to Illinois, and thence it is followed over railways to the great towns of the West. With us, though the course of the rinderpest is sufficiently established, there are generally some doubtful links in the chain of communication, but in this instance every step is discernable.

"The gentleman who thought it a fatal objection to a precautionary measure that it might slightly raise the price of meat in the London market, may, perhaps, accept instruction from the fact, that on the appearance of this disease, the supply of beef in the markets of New York and Chicago had fallen off at least one-half. They may see that, from fear of a slight and very doubtful disadvantage, they would have exposed us to the certain peril of an occasional meat famine. This example may also give us occasion to reflect, that at least in the present state of our knowledge, we are quite unable to rely on special acts of precaution against the introduction of a contagious disease. Here is a disease, not less fatal than the rinderpest, of which we have only just heard; and, besides this, its approach is so sudden and so subtle as to leave no time for exceptional measures. Cattle apparently healthy are dispatched to New York, and within three days after their arrival they have given birth to a malady which may destroy all the stock in the State. That is the danger to which we are exposed the instant we relax our restrictions. Inspection might some day fail to detect the germ of disease in half a dozen animals, and the cattle of as many counties might be decimated in a month. Our knowledge is not sufficiently extended, our means of information not sufficiently complete, our methods of observation not sufficiently subtle, for inspection to offer any sufficient security. It is somewhat singular that we should only now be learning to what subtle and contagious diseases our most valuable stock is exposed. Like other knowledge, this has probably been lost from mere want of due records. If the past history of the diseases of mankind had been preserved for us, medical science might now be in a very different position. This disadvantage will scarcely be allowed to check our progress for the future. The New, as well as the Old World, will

THE FIRST POST-MORTEM EXAMINATIONS.

The next day, Sunday, August 9th, the president of the abattoir informed the Board of Health that all the surviving bullocks of Mr. Alexander's infected herd were to be slaughtered and sacrificed at the fat-rendering tanks, and he invited the officers of the Board to be present and make whatever examinations they desired. This invitation was accepted, and during the afternoon the officers in attendance witnessed the slaughter of a large number of the herd, and made minute examination of the viscera and fluids of three of those that were most diseased. The record of these and all other post-mortem examinations of cattle will be found in the proper place in a subsequent section of this report. But we would here remark that the excessive temperature of the blood and viscera of the sick bullocks, immediately upon the slaughter, was so uniform and striking as to confirm the opinion that had been expressed by the Registrar, concerning the significance of this fact in regard to the pestilential nature of the sickness; yet in these first examinations there was so great an amount of evidence of other kinds, which required the analysis of the microscope and of the chemist, that arrangements were immediately made to have the morbid specimens so examined by Dr. R. Cresson Stiles, the Deputy Registrar of the Board, an acknowledged authority in pathological and microscopical researches, and by Professor C. F. Chandler, the chemist to the Board. The subjoined note from Dr. Stiles gives the first result he reached in the microscopical examinations which he made of the specimens obtained on the 9th and 10th of August:

BROOKLYN, August 12th, 1868.

E. HARRIS, M. D., Registrar, etc.:

Dear Sir—I have examined carefully the specimens of the plague cattle which I took on Sunday (August 9th). I went at them at once, before decomposition could change their character.

The Blood.—Not a single red blood disk could be detected. The red disks had parted with their coloring matter, and the serum was of a dark mahogany color. This evidence of disorganization of the blood is a most important fact, as indicating the nature of the disorder.

The Urine.—Was of a glutinous character, excessively albuminous; the blood corpuscles, which were abundantly contained in it, were shrivelled and crenated. The urine was of a claret color, and contained a few casts of the tubuli uriniferi.

The Kidneys.—Were deeply congested with dark blood, and their glomeruli and tubuli uriniferi were filled with extravasated blood.

(Signed)

Yours,
R. C. STILES.

Thus the work of scientific inquiry commenced; and the foregoing quotations from the first written statement by Dr. Stiles concerning the patho-

yield experience, and we think we may fairly expect from our men of science that, with their means of observation, they will materially advance our control over the conditions of health. At all events, such an example as the present deserves the utmost attention, and we shall await with the greatest interest the further history of the 'Texan Fever.' "

logical changes which characterize the disease, show what direction this kind of inquiry took. The notes of the observations made upon this first group of infected cattle will be found in the subsequent chapter of this report. Unfortunately our efforts to procure a complete chemical analysis of the fluids from these first cases were unsuccessful; yet from one of this herd that was slaughtered on the eighth day of convalescence, entire success attended the analysis of the blood, etc.

Having examined as many of the animals as practicable in this first herd before and during slaughter, it was deemed expedient to have a certain number of the bullocks that exhibited unmistakeable symptoms of the disease, and yet were not rapidly sinking or incapable of moving about, selected and kept under medical observation and care, in order that the nature of the disease might be suitably studied, and if the sick bullocks survived through certain periods of partial or actual convalescence, they might, at suitable times be, one by one, slaughtered for the purpose of making post mortem examinations of the results of the disease, and the mode and rapidity of convalescence from it. Consequently, by the liberality of the agent of the stock, five such diseased bullocks were selected and placed by themselves in a large yard that was spread with a bed of sawdust saturated by heavy oil of coal tar, and they were allowed to spend the greater part of each day in an adjacent meadow of luxuriant salt marsh grass. The further treatment of these sick cattle, and the results of final examinations of them when slaughtered, will be found in the subsequent sections of this report, under the heads of "Inspection and Care," "Chemical Analysis," and "Post-Mortem Records." But it should be mentioned here that the results of these observations were more definite and satisfactory than we had anticipated. In fact, the investigations pursued in regard to this first group of infected cattle served to open up the whole field of inquiry that was subsequently occupied by the medical officers who followed up the subject.

The fact must here be mentioned that the excessive pressure of regular official duties, the difficulty experienced in securing the attendance of each officer and expert at the hours of slaughter, and the great distance and inconvenience of access to the abattoirs from the chambers of the Board of Health, offered serious impediments to successful study of the disease at the beginning and throughout the entire season. These and other considerations led us to hope and greatly to desire that the State Commissioners of New York and New Jersey, who still had authority under their commissions to guard against rinderpest and contagious pleuro-pneumonia, might, as soon as they could organize for the purpose, assume all the responsibilities and expenses of the investigations which needed to be made concerning the new disease.

Another fact ought also to be stated in this place in regard to the co-operation of veterinary experts in these investigations. Such co-operation was desired, but as there were no pecuniary means for procuring or properly

compensating such persons, and as it was hoped that the entire responsibility in the matter would soon be assumed by the State Commissioners, as just mentioned, we early endeavored to give to leading professors of the New York College of Veterinary Science information of the opportunities to inspect infected cattle. Professors Liautard and Busted of the New York College, and Prof. Law of the Cornell University, did witness some of the post mortem dissections. But as the fact was soon ascertained that no funds were provided for the State Commissioners to expend upon such inquiries, or for any purpose whatsoever, those medical officers whom the Board directed to begin the investigations were compelled by circumstances, and their own sense of duty, to continue the work. Events succeeded each other so rapidly that these officers had to meet the exigencies day by day, and seek such information and do such acts as seemed most important for the Board and the public, or, by neglecting these duties, let the golden opportunity for investigating and restraining the malady be left until some future outbreaks of it, and to allow this opportunity for the hygienic inquiries connected with the malady to pass by unimproved.

The arrival of a badly infected herd of fat beeves by the Erie railroad, on the morning of the 11th of August, while yet no other organization for investigation was in existence, induced the Board of Health to order that this matter should henceforth be placed under the advice and direction of its Sanitary Committee, to do whatever they should deem necessary to represent and discharge all the duties which the public could reasonably expect from the Board in regard to the control of the diseased cattle, and the investigation of the whole subject. Subjoined is a copy of the Board's minutes relating to this duty of the Sanitary Committee and associated medical officers:

THE BOARD'S ORDERS FOR ORGANIZING THE LABORS OF INQUIRY.

At a meeting of the Metropolitan Board of Health, held on the 11th of August, and at which reports in relation to the first two infected herds were presented, the following action was taken:

[Copy.]

Resolved, That the Sanitary Committee of the Board be and hereby is empowered to detail expert officers, not exceeding four in number, who are connected with the Board, to act under the orders of said committee in the investigations of the facts relating to the prevailing *cattle disease*.

The committee ordered the labors to be organized in accordance with the following instructions:

METROPOLITAN BOARD OF HEALTH, }
August 11th, 1868. }

To E. HARRIS, M. D., *Registrar and Corresponding Secretary M. B. H.*:

Dear Sir—At a meeting of the Board of Health, held August 11, the subject of the prevailing cattle disease was referred to the Sanitary Committee for investigation and report. The committee was empowered to add, not to exceed four

members (who should be officers of the Board), to their own number for such investigation. In pursuance of this power the Sanitary Committee has selected you as one of the additional members of the committee.

It is the desire of the committee that you proceed to organize the work of investigation, and so distribute its several subjects among other members, and control their operations, as to secure the most perfect results.

Yours, &c.,

STEPHEN SMITH, M. D.,

Chairman Sanitary Committee.

METROPOLITAN BOARD OF HEALTH, }
August 12th, 1868. }

To R. CRESSON STILES, M. D., *Deputy Registrar M. B. H.:*

Dear Sir—The subject of cattle disease as it has appeared in the markets in and around New York, has been referred to the Sanitary Committee for study and report. Your committee was empowered to add to its number such officers as it deemed necessary, and accordingly it has selected you for the special duty of studying whatever pathological alterations you can discover in the tissues and fluids of the infected animals, and that you will avail yourself of whatever aid the microscope can give in these researches.

You will devote all the time that is necessary for a thorough investigation of the disease, and make full and accurate notes of your observations.

You will also keep in constant communication with Dr. Harris, and follow his directions in your work, unless otherwise directed by the Sanitary Committee

Truly yours,

STEPHEN SMITH, M. D.,

Chairman Sanitary Committee.

[METROPOLITAN BOARD OF HEALTH, }
August 12th, 1868. }

To DR. MORREAU MORRIS, *Sanitary Inspector M. B. H.:*

Dear Sir—The subject of cattle disease as it has appeared in the markets in and around New York, has been referred to the Sanitary Committee for study and report. The committee was empowered to add to its number such officers as it deemed necessary, and accordingly it has selected you for the special duty of studying the symptomatology or clinical history of the affection as it appears in the herd yards.

You will devote all the time to this duty that is necessary for a thorough investigation of the disease, and make full and accurate notes of your observations.

You will also keep in constant communication with Dr. Harris, and follow his directions in your work, unless otherwise directed by the Sanitary Committee.

Truly yours,

STEPHEN SMITH, M. D.,

Chairman Sanitary Committee.

A similar requisition was made upon Prof. Chandler, Chemist to the Board, for his aid in the necessary chemical analysis; and, at a later date, the duties of Dr. Morris being enlarged by his appointment as Assistant Commissioner for the State, it became necessary for the committee to employ the aid of one of the assistant sanitary inspectors, and Dr. Benjamin

Howard was therefore selected to render such temporary assistance, as was required in post mortem examinations, etc.

In carrying this purpose of the Board into effect, Dr. Stiles gave his attention to the special pathological investigations requiring microscopical examinations. Dr. Moreau Morris continued his duties of inspection of the herds arriving at the New York market, and was requested to have charge of the medical observations upon all diseased cattle, and, with Dr. Stiles, to report to the central office daily concerning the progress of the inquiries. To Prof. C. F. Chandler, of the School of Mines, Columbia College, and Chemist to the Board, was committed the chemical analysis of morbid specimens from the diseased animals, and for which duty he thoroughly prepared two of his assistants. The Registrar of the Board, as the medical officer in charge of the researches, organized and pushed forward the inquiries, visited the infected cattle, and was present at the post mortem examination when possible, and had the general supervision and control of the work, and was especially charged with the organization and maintenance of the scientific investigations.

It was plainly necessary to have such organized labor in order to centralize and give efficiency to whatever investigations might be undertaken. The Board needed all the information which could be brought to its central office daily, both for its own use and to satisfy inquiries constantly made in regard to this disease.

THE ARRIVAL OF AN INFECTED HERD FROM INDIANA.

On the evening of August 10th, the superintendent of the Bergen cattle yards, Hudson City, N. J., applied to Gov. Ward and Dr. Harris, who were then at Communipaw, asking their advice as to the disposal of a herd of seventy or more infected cattle, then on the way from Campville (Erie railroad herd yards) to his sales yards at Hudson City, to arrive next morning. Early next morning, August 11th, Sanitary Commissioner Dr. Stephen Smith, Inspector Morris and Dr. Harris visited the yards and herd-train near the Hackensack river, where this lot of infected cattle had been switched off from the Erie railroad. Here were seen several fine fat bullocks in a dying condition, and no less than fifteen out of this herd—now consisting of sixty-six cattle—were evidently in a hopelessly diseased state.

For a detailed account of the observations which were made upon this herd, we would refer to Dr. Morris' report upon his department of labor, in a subsequent section. But this group of infected bullocks exhibited the symptoms and pathological effects of this disease with such completeness, and the entire history of the herd itself, the source whence they received the infection, the period of incubation, and whatever else could be a matter of exact inquiry, were such that the Board's officers made great efforts to have these dying cattle made the subject of the most thorough investigation. Arrangements were made for the observation of symptoms and post-mortem

evidences ; and Governor Ward took the preliminary steps for keeping the entire herd under close observation. Correspondence was immediately opened with the Governor of Indiana, for the purpose of tracing every step and every day of the history of this herd, which belonged to a Mr. Thomas, of Warren county, in that State.

In all that is essential in the history of this herd, these efforts were entirely successful ; but, in the absence of official authority in the town where these cattle were, speculators shipped about fifty of them to parts unknown, yet five of the worst diseased animals were left for the careful examination of the officers of the Metropolitan Board. This examination will justly be regarded hereafter as being, in every important respect, among the most valuable of all that were made during the whole series of inquiries of the Board ; for there in the open field, and in the presence of the quivering flesh of the bullocks immediately upon slaughter, the microscope, under the skillful hand of Dr. Stiles, revealed all the morbid phenomena in the blood, bile and tissues, which finally we have come to regard as being characteristic or pathognomonic of this strange disease. Dr. Stiles, Dr. Morris and Dr. Harris spent the entire day, August 13th, in these investigations ; and Commissioner Dr. Stephen Smith was present to witness the most important of the autopsies, and verify with his experienced eye, as a professor of anatomy, the demonstrations by Prof. Stiles. He witnessed the first demonstration of the reticular structure or arrangement of the ultimate bile-ducts, as revealed under Dr. Stiles' microscope.

To have preserved those morbid specimens in a fit condition for perfect microscopical researches at a later hour, or away from the field, would probably have defeated or long postponed the ends which were achieved that day ; for it was necessary to determine what morbid changes in tissues, and what, if any, parasitical organisms, or other morbid elements, could be found, actually pertaining to the diseased cattle at the moment of their being killed. The liver, the bile, the spleen, the kidneys and the blood, the stomachs, the brain and the muscular tissues were each, in succession, examined with great minuteness and care. The nature of the discoveries that were made during that day will be fully explained in Dr. Stiles' special reports, and the colored plates in subsequent sections.

THE HISTORY OF THIS HERD AS AN INDEX TO THE FUTURE INQUIRIES.

His Excellency Governor Baker, of Indiana, through Captain James Park, who served as the agent in the inquiries in that State, and Dr. J. G. Orton, Assistant State Commissioner of New York, and subsequently in charge of affairs at Campville, on the Erie railroad, as soon as the desired inquiries could be made, filled up every link in the history of this herd, and early in September communicated the facts as follows :

[Copy.]

INDIANAPOLIS, September 4th, 1868.

E. HARRIS, M. D., *Corresponding Secretary Metropolitan Board of Health :*

Dear Sir—in reply to your communication of the 15th ult., making inquiry and desiring information concerning the cattle disease, I have the honor, by direction of the Governor, to transmit herewith a copy of a report made to this department by Captain James Park, of Warren county, Ind., upon the subject.

Respectfully,

(Signed)

JOHN M. COMMONS, *Private Secretary.*

[Copy.]

WILLIAMSPORT, IND., August 31st, 1868.

To his Excellency Governor BAKER :

As requested by your letter of the 22d inst., I herewith transmit such a report of the facts in regard to the cattle disease as I think will meet the inquiry of the Metropolitan Board of Health.

On the 27th day of April, 1868, a herd of nine hundred and thirty Texan cattle were purchased at Colorado county, Texas. They were driven to the mouth of Red river, a distance of about six hundred miles, reaching that point May 31st, 1868.

They were at once shipped from that point on steamboats, and arrived at Cairo, Ill., June 4th, 1868. From thence they were shipped on the Illinois Central railroad, and reached Tolono, Ill., June 7th, 1868. From this point they were driven into Warren county, Ind., a distance of about sixty miles. They came into the western boundary of Warren county on the 12th June, 1868. There was a loss of forty-four head, only eight hundred and eighty-six of the nine hundred and thirty head reaching Warren county. These cattle were from four to six years old, all apparently in good condition, nothing indicating any disease whatever. There were "ticks" on very many of them. This herd is still at the present date in Warren county, Ind., all doing well, and no disease whatever having made its appearance among them; not one has died, notwithstanding more than five hundred native cattle have died all around them. This herd of Texan cattle, on the 12th day of June, 1868, passed over a certain piece of prairie pasture on the western boundary of this county (Warren). On the 19th day of June, 1868, a lot of native cattle, numbering ninety-five head, averaging over thirteen hundred pounds each, were permitted to graze upon the same pasture, and continued to feed upon the same until the 4th of August, 1868. One of the herd was noticed to be sick on the 28th of July, 1868, and up to the 4th of August, 1868, eleven were sick and three had died. On the 4th of August, 1868, eighty-four of this lot of ninety-five were driven to the West Lebanon railroad station, on the Toledo and Wabash railroad, and shipped for the New York market. This is, I presume, the herd of sick cattle referred to in Dr. Harris' letter. There were eleven head of another lot that had not been on this pasture, or in any way exposed to Texan cattle, shipped with the eighty-four; none of the eleven head were taken sick on the road to New York, but the sickness was confined to the eighty-four head exposed to the Texan cattle; at least had herded upon pasture passed over by Texan cattle.

On the night of the 12th of June, 1868, this lot of Texan cattle herded on another piece of prairie where a lot of one hundred head of native cattle were feeding. On the morning of the 13th of June, the Texan cattle were driven to

the north of the county. Fifty-five of the one hundred head of native cattle were three years old, the rest were one and two, all in good growing condition. On the night of the 12th of June, 1868, there were twenty-six head of native fat cattle in an adjoining enclosure to the ground occupied by the Texan cattle. About four weeks after the 12th of June, these twenty-six fat cattle broke out of their enclosure, and grazed upon the prairie where the Texan cattle had been on the night of June 12th. On the 29th of July, one of these twenty-six was discovered to be sick, and died on the night of July 31st. On the 1st day of August, two of the one hundred had died, and some twenty-five more were sick. From that time up to the present, the entire herd have been taken sick; eighty-eight head out of the one hundred have died; twenty-two out of the twenty-six have also died; total, one hundred and ten out of one hundred and twenty-six. The remaining sixteen head have all been sick, and are now very poor and stupid, but have the appearance of getting well.

As a fact, wherever native cattle have passed over ground where this Texan herd have been, the native cattle have sickened and died. It is also a fact that other Texan cattle have been brought into this county, have been herded with native cattle for two months, and as yet no disease has made its appearance. We have had over four thousand head of Texan cattle in this county this summer.

I have the honor to be,

Very respectfully, your obedient servant,

JAMES PARK.

Concerning the lot of cattle which Captain Park mentioned as having been shipped from the West Lebanon railroad station on the evening of August 4th, the following note was received from Assistant-Commissioner Dr. J. G. Orton, of Binghamton, N. Y., soon after he assumed the duties of his office:

* * * On the 9th of August last, from a lot of five (5) car loads of cattle shipped from Buffalo, consigned to J. M. Thomas, and yarded off at Campville for feed and rest, seven (7) had died, it is supposed, from the then prevalent cattle plague.

Eleven others, exhibiting clearly developed symptoms of the disease, were detained and enclosed in a yard by themselves. These all died in about three days. The survivors went through to the Bergen cattle market in the usual course. The eleven diseased cattle, I am informed, all manifested the usual symptoms of the plague, namely, rapid pulse, loss of appetite, head turning or drooping to one side (*torticollis*), discharging mucus from mouth and nose, urine bloody, and finally, inability to walk or stand alone. As these cases occurred several days previous to my appointment as assistant-commissioner, I had no opportunity, I regret to say, of making any examination of the bodies. They were hurriedly buried in trenches just outside of the cattle yards.

Very respectfully yours,

(Signed)

J. G. ORTON, M. D.,

Assistant Commissioner of the State.

BINGHAMTON, Broome County, N. Y.

It will be noticed that in the three separate accounts which we have here given concerning the herd of farmer Thomas, of Warren county, Indiana,

there is not only entire harmony in every particular as regards the statistics and movements of this herd, but also as respects the sickness that befell the infected cattle. This herd numbered eighty-four head, Captain Park informs us, when they left Indiana; they filled five transport cars and part of a sixth (the remaining space of the sixth car being occupied by eleven cattle that had not before been exposed to the disease, says Captain Park). At the Bergen cattle yards, near the Hackensack river, on the morning of August 11th, Commissioner Stephen Smith, Dr. Harris and Dr. Morris found sixty-six cattle, just arrived, in the care of the same Mr. Thomas, and no less than fifteen of this number were then sick. The eleven cattle mentioned as uninfected by Captain Park, and that occupied a part of the sixth transport car, were all living, healthy, and were quickly sold for sound and healthy beeves. Finally, Commissioner Orton's letter shows that eighteen out of the eighty-four cattle which the owner, Mr. Thomas and Governor Baker's State agent, Captain Park, separately aver to have been exposed to the infection of Texan cattle, died in the course of four days at the Campville herd-yards, on the Erie railroad. Of course but sixty-six survivors remained, and these were hurried onward to the New York market on the 10th of August, and were the next morning seen in the condition just mentioned.

In regard to any or all the points in a record so clear and well stated as this is, no comment can add anything to the strength of the argument which every intelligent person will discover in it. We would simply call attention to the fact that the record given by Captain Park concerning the herd shipped from West Lebanon, on the Toledo railroad, the statement given by farmer Thomas, the owner of the cattle, who came on with them, and who gave us the information personally in the yards where his cattle were dying, near Hudson City; and the record of events connected with this herd at Campville, and elsewhere on the Erie railroad, harmonize with and verify each other in every particular. And it should here be observed that in this instance as in others, to be noticed in Dr. Morris' report, there is ample presumptive proof that owners of infected herds, and particularly the speculators who dealt in such stock, regarded a hurried transportation to the New York market as the shortest and surest way to avoid the losses liable to be incurred by keeping such cattle for a day longer than their circumstances compelled them to keep them.

FIRST CASES OF THE CATTLE DISEASE SEEN IN THE METROPOLITAN DISTRICT.

Two weeks subsequent to the occurrence of these events, it became known to the Board of Health that a small herd, eighteen in number, which had left West Albany, July 28th, in charge of Mr. Stephen B. Reynolds, their owner, and which arrived at Peekskill by the Hudson River railroad, July 29th, and at Sing Sing, by overland driving, July 30th, proved to be infected with the Texas cattle disease. They were Illinois

cattle, and had been purchased for immediate home consumption at Sing Sing and the neighboring villages. Mr. Reynolds sold four to Mr. B. G. Tompkins, a butcher at Sing Sing, and five others to Messrs. Raymond & H. J. Sarles, also butchers at Sing Sing, and four to Mr. Wright Tompkins, a butcher living east of Sing Sing, and the remaining five of this herd Mr. Reynolds drove to his own farm in the town of Somers, eight or ten miles east of Sing Sing. The circumstantial history of this herd is correctly and briefly given by Dr. George J. Fisher, the Sanitary Inspector of the Metropolitan Board of Health for that section of the Metropolitan District.

[Copy.]

ELLIS PLACE, SING SING, August 27th, 1868.

Dr. E. HARRIS, *Corresponding Secretary and Registrar, M. B. H. :*

Sir—I deem it my duty to make a brief report of the facts concerning the introduction of diseased cattle into Westchester county. On the 28th day of July, Stephen B. Reynolds, a cattle dealer living in the town of Somers, Westchester county, purchased eighteen bullocks of a cattle dealer in Albany, N. Y., being a portion of a lot of cattle said to have come from Illinois. These eighteen bullocks were immediately sent to Peekskill, N. Y., on the cars of the Hudson River railroad, whence they were driven directly to Sing Sing, a distance of twelve miles. On arriving at the latter place (July 30th), the owner, Mr. S. B. Reynolds, sold four of the cattle to B. G. Tompkins, a butcher in Sing Sing; five to Charles Raymond and H. J. Sarles, also Sing Sing butchers; and four to Wright Tompkins, brother of B. G. Tompkins, who is a butcher living east from Sing Sing. The remaining five Mr. S. B. Reynolds drove to his own farm in Somers. Within two or three days after their arrival, Raymond & Sarles slaughtered three of their five cattle and sold the meat in Sing Sing, as they allege, not suspecting the cattle to be diseased, and still believing them to have been sound and healthy at the time they were slaughtered. Mr. B. G. Tompkins, also slaughtered one of his four cattle about the same time, and sold the meat in his market; his butcher says he did not observe anything to be the matter with the bullock, and believes that he was not diseased.

The first thing which aroused the suspicion of the butchers was, that on the 4th day of August, S. B. Reynolds brought to Sing Sing and offered for sale to the butchers, the quarters of one of the bullocks which he had driven to his own farm, and stated to the Sing Sing butchers that the bullock was found cast in, or near a brook in his pasture, and supposing the animal had received some mechanical injury, slaughtered it and brought the meat to Sing Sing for sale. He first offered it to B. G. Tompkins, who refused to purchase it; next to H. J. Sarles, who also declined buying it; after which he took it to Croton (where a number of laborers are engaged in bricklaying), but finding no purchasers he returned to Sing Sing and asked Sarles to allow him to leave the hindquarters in his ice-room; this being granted he took the forequarters to the camp-meeting grounds, and offered to sell them to Mr. George Worden, the only person authorized to sell meat to the camp-meeting people, who also declined purchasing the meat.

While Reynolds was yet engaged in seeking a purchaser for his "injured beef," Mr. William Dubois, a farmer, two miles northeast of Sing Sing, came to the village and informed G. B. Tompkins that one of his cattle was dead, and the remaining

two were sick on his premises, where they had been driven after they were purchased of Reynolds. This information at once convinced the butchers that they had diseased cattle on their hands, and that Reynolds' beef, which he had been hawking about, and fortunately had found no customer for, was "diseased meat," and that his bullock had been cast by the plague and not by accident. Sarles immediately took the responsibility of having the hindquarters of Reynolds' beef taken from his ice-room and thrown into the mouth of the Croton river, and immediately informed Reynolds of the course he had taken, whereupon Reynolds buried the remaining forequarters in the offal heap at Raymond's slaughter yards, a mile east of Sing Sing, and thus the diseased meat was disposed of.

I have now accounted for five of the eighteen cattle; the remainder are accounted for as follows:

August 3d.—One died at Dubois' farm, belonging to B. G. Tompkins (already mentioned).

August 6th.—Wright Tompkins found two dead in his field, and S. B. Reynolds found one nearly dead, and had it killed for post-mortem examination by Mr. Edward Underhill, a scientific farmer and an expert.

August 7th.—Another died at Dubois' farm, belonging to B. G. Tompkins.

August 8th.—S. B. Reynolds found another bullock dead in his field. B. G. Tompkins killed the last of his four, for examination by Dr. Collins and myself. The bullock was nearly dead before he was knocked in the head.

For the remaining six I cannot account. S. B. Reynolds and Wright Tompkins had each two of them. Whether they are sick or well, dead or alive, I cannot tell.

The two which were sick and remaining in possession of Raymond & Sarles, are said to have been given (August 9th) to William Elliot, a cattle dealer at Putnam county.*

Yours respectfully,

(Signed)

GEORGE J. FISHER, M. D.,
Assistant Sanitary Inspector, M. B. H.

The extracts from evidence on file at the chambers of the Metropolitan Board of Health are introduced in this place, to show the actual state of affairs connected with the movements and handling of infected beeves within the Metropolitan District. Prudential considerations, and a due regard for the mental tranquility of the people, made it expedient to say and do those things only which would restrain the movement of infected cattle, and utterly prevent the sale of the beef and viscera of the dying animals in the markets. These two great objects, we have every reason to believe, were accomplished very completely.

ORGANIZATION OF THE NEW YORK STATE CATTLE PLAGUE COMMISSIONERS.

On the 18th of August, the State Commissioners, Messrs. Patrick, Gould and Allen, having assembled at Albany, organized a suitable plan for the inspection and control of diseased herds wherever found within the State, and, as soon as their instructions had been promulgated, viz., on the 19th

* A citizen of Sing Sing has since reported to this committee that these two sick beeves were sent down to our city markets.

of August, the committee in charge of investigations for the Metropolitan Board of Health offered to make over to that commission all results and resources then at its command; but, as was ascertained by them in the course of a few days, there were no funds at the command of the commissioners that could be made available for carrying on such investigations. Moreover, the commissioners expressed, in very decided terms, their approval of the labors in progress under the Board of Health, and of their preference and desire that the Board should independently carry forward all the inquiries which its officers had begun. Hence, the Board's committee saw no other course than that which they had commenced upon; but they earnestly invited the co-operation and advice of the commissioners. From the organization of the Commission until now there has existed an entire and hearty unity of effort between them and this committee of the Board.

THE LABORS OF SANITARY INSPECTOR MORRIS, AS ASSISTANT COMMISSIONER FOR THE STATE.

During the first session of the State Commissioners, August 18th, they appointed Dr. Moreau Morris as their assistant for the Metropolitan District. As they had immediate occasion for expert inspection, by him, at Millerton and Copake, in Dutchess county, Dr. Morris proceeded thither to make the desired observations and give the necessary orders. The circumstances attending the appearance of the Texas cattle fever, in Messrs. Smiths' herd of western bullocks *en route* overland from Albany, as detailed by Dr. Morris, are full of instruction concerning the subtle course of the infection and the usefulness of restrictions against the movement of the infected cattle. The prompt action which was taken by Dr. Morris, in regard to the isolation and restraint upon all movements of that infected herd, had a very wholesome effect upon the public mind, in allaying anxiety, and upon the speculators and shippers of damaged cattle, in restraining them from such traffic.

It is no part of the design of this report to enter upon an examination of those abuses and frauds of the cattle trade, by which our meat-markets are continually exposed to the sale of diseased and injured beef; but there are a few points in regard to this matter which, as a sanitary inspector of the Metropolitan Board of Health, Dr. Morris investigated in the course of his inspection of the herds and butcheries, before he went up the railroad to Millerton, to arrest the movement of the sickly herd which is here mentioned. He had obtained evidence of the fact that sick cattle, when discovered in the herd-yards, are sold, slaughtered, and pushed forward to the meat-stalls of the markets as speedily as possible, and that this perilous business was, last summer, and it usually has been, in all probability, so adroitly managed, that, with the exception of the infected cattle found near Sing Sing by Dr. Fisher, no inspector of the Board of Health had succeeded in finding any animal affected with the Texas Cattle Disease within the Metropolitan District, previous to August 17th. Ample proof

has been obtained that several cases of this disease had been witnessed by the herdmen in the city of New York, during August, and previous to the date here mentioned. Inspector Morris carried out, in the most admirable manner, the views which the Board of Health had authorized and directed its committee to publish on the 13th of August; and in the telegraphic orders which he received from the President of the State Commission, he was "empowered and directed to carry out the suggestions of the Sanitary Committee, as published in the New York papers."

Combining in one competent and already thoroughly experienced sanitary officer, the functions and authority of an assistant commissioner for the State, and the duties of a sanitary inspector under the Board, as was happily accomplished in the service of Dr. Morris, the proper inspection and police of all herds and herd-trains, and the timely care of all infected cattle, became certain. To provide for the constant inspection and sanitary supervision of the great herd-yards at One Hundredth street—the chief market for beeves in New York—he appointed Mr. Dayton, and with him he conferred daily at the yards; and, to meet the exigencies that might continue, until frost, in regard to the sales yards on the New Jersey side, he appointed Mr. Taylor for Communipaw, and Mr. Newkirk for Hudson City and Hoboken, who, as the commissioned inspectors under authority of the State of New Jersey, and as commissioned agents for the State of New York, under Dr. Morris, reported to him all their transactions daily. Other inspectors and one expert detective were also employed by Assistant Commissioner Morris, in New York. With this simple and readily managed organization, that officer has continued to maintain a sufficiently rigid and searching espionage upon the condition and movement of all cattle in the two cities. The Board's officers have, of course, given him whatever aid they could, and so, likewise, has the sanitary company of the Metropolitan Police; yet it is due to this faithful and untiring assistant commissioner, that the fact should be stated in this place, that to his hearty devotion to the interests which the Board of Health required him to guard, and to his fearless and prudent discharge of his functions as a State officer, is largely due the successful execution of the plans of the Board for both controlling and investigating the disease. He made it an invariable rule personally to inspect every infected herd, and firmly to apply the sanitary regulations which were advised by the Board and by the State Commission. The methods and regulations which were adopted in his service are set forth in this report. It can with truth be stated that, in the administration of the duties of his position, he convinced all classes of men of the justice and good judgment of his acts. With habits of accurate medical observation, and with the trusty self-registering thermometer in his hands, he avoided error in his diagnosis and judgment concerning diseased cattle, and in every way he proved how vastly superior is the exact knowledge of the physician over the merely empirical kinds of knowledge and judgment to which the diseases and sanitary control of herds are usually committed.

THE DUTIES OF DR. R. CRESSON STILES, AS PATHOLOGIST AND MICROSCOPIST, IN THIS INQUIRY.

The two papers that are submitted in this report by Dr. Stiles, sufficiently explain the nature of his duties in connection with the investigations. But the actual amount of toil and care, the expenditure of time and study, the patient manipulations of specimens under his excellent microscopes, and the nice analysis of whatever pathological or other physical conditions were essential or constant in the diseased cattle, severely taxed the well sustained enthusiasm which he has for years displayed in the cultivation of physiological and pathological knowledge. He was present at the first series of post-mortem inspections with his microscopes and re-agents close by the dying and freshly bleeding bullocks, for it was from the first deemed vitally important to exclude all possibilities of studying abnormal conditions of tissues and fluids that might after all be merely post-mortem changes. He, therefore, attended at the slaughtering and post-mortem inspections as often as he could; and, when absent from them the specimens to be examined microscopically and otherwise by him, were carefully inclosed in stoppered glass vessels, the stopper being washed with cresylic acid, and the specimens, thus guarded, being forthwith forwarded to him.

The scientific investigations which the Board of Health has encouraged the Registrar and Deputy Registrar to pursue during the past three years, rendered it easy for these officers to undertake a certain amount of inquiry in regard to this cattle disease, but had it not been for the unusual qualification of Dr. Stiles, the Deputy Registrar, for the pathological researches which were required, all the good purposes and desire for thorough investigation of the essential nature, causes and morbid phenomena of the cattle plague would have enabled the Board and its medical officers to add but very little to the stock of useful knowledge. The Registrar states this fact with gratitude, and without in the least depreciating the value of any labors performed by other officers of the Board.

This labor of Dr. Stiles has been continued from the 9th day of August to the 1st day of December, the first being the commencement of examinations in Mr. J. T. Alexander's infected herd at Communipaw; and the last being an examination of morbid specimens from two diseased Texas cattle that were taken off a train at Buffalo, and carefully dissected by Assistant Commissioners Morris and Mackey, in the presence of the State Commissioners.

Bringing to these patient researches a well-trained mind, with excellent experience and skill in analytical study of healthy and morbid conditions of the animal organism, Dr. Stiles' aid in our investigations has been of the most indispensable character. And it must be regarded as particularly fortunate that in the absence of means for employing a special corps of anatomists and pathologists, the Board could obtain and use such skill as that of the gentleman here mentioned.

THE AID OF CHEMISTRY IN THE INVESTIGATION OF THE DISEASE.
 PROF. C. F. CHANDLER'S LABORS.

The excellent example of the Royal Commission in England for investigating the rinderpest in 1865-6, warranted the hope that analytical chemistry might bring out more definite results from the Texas cattle disease than had been attained even in the English researches. But as we were dealing with a blood disease, that had a much longer period of incubation of its infectious cause than the rinderpest has, and which also produces very decided alterations in the proximate and elemental constitution of the liver and some other viscera, it was thought best to submit the blood, bile and urine to the most exact analysis, in accordance with plans somewhat different from those which Dr. Marcet, the chemist to the Rinderpest Commission, pursued. Prof. Chandler has sufficiently explained the methods he pursued, in a note appended to the tabulated results which we present in this report.

Very great care was exercised in the taking and sealing of morbid specimens for chemical analysis, and the aid of chemistry was especially invoked in the cases that most emphatically declared the symptoms and uncomplicated phenomena of the disease. Wherever it was practicable, Prof. Chandler attended in person at the post-mortem examinations, and with his own hand took the specimens and sealed them for his laboratory. In all cases the analyses were made as soon as possible after the specimens were taken.

Out of the whole number of these analyses, Prof. Chandler has selected for tabulation in this report only those in which his success in the entire process of treatment was most thoroughly perfect and unequivocal. By referring to the section in which these results are tabulated, it will be seen that there are fourteen (14) specimens of blood, nine (9) specimens of bile, four (4) of serum from the abdominal cavity (cases in which ascites and copious effusion had occurred), four (4) analyses of urine (black water), and four (4) analyses of the liver.

The exceeding nicety and skill which are required in the analysis of blood and bile, were appreciated and provided for by Prof. Chandler and his very skillful assistants in the laboratory. And, notwithstanding we did not at first venture to hope for very positive results from chemistry, to aid in the pathological investigation which the Sanitary Committee of the Board of Health required to be made, it is now found, in the final summing up, that almost any other element in the pathological study could be spared or omitted—microscopy alone excepted—rather than to now omit the results that chemistry has independently contributed. We say independently, because the chemist was requested to ascertain all the essential constituents of the specimens submitted to him, and permit no errors or loss in his quantitative estimation, regardless of any ideas he might entertain concerning the disease.

We have requested the Professor to append the results of the analysis

of healthy bullock's blood, as analyzed in his own laboratory, and also to place at the foot of his table of analyses the mean of all the results in the analysis of blood from fourteen healthy bullocks, also the result obtained by Wm. Marceet, Esq., for the English Commission in 1866.

It is hardly necessary to state to medical men, but it must be remarked for non-medical readers of this report, that the chief objects to be attained in all these analyses by the chemist to the Board were: 1. To ascertain what changes in the proximate elements of the blood are found to characterize the disease, particularly as regards waste and deficiency in its solid constituents, and to point out what elements are so affected; 2. To ascertain the state of the serum found in cavities of the diseased cattle; 3. To ascertain in what respect the bile and the urine differed from those fluids in healthy animals; and 4. To ascertain the actual chemistry of the liver, and particularly as regards the percentage of fat in it in the chronic cases of the disease. In all this work chemistry is the aid and verifier of deductions reached by the different methods of microscopy and medical observation. Finally, in regard to the merit of Prof. Chandler's labors in this matter, we feel warranted in stating that for accuracy and definiteness, we know of no other series of analyses of bullock's blood, and of the other elements of the body in disease, that exceed the accuracy of the results which the chemist to the Board now contributes to this report.

THE SKETCHES OF MORBID ANATOMY BY MR. KOEHLER.

This work was begun on the 10th of August, the artist being conveyed to the place of slaughter, and, in all cases, when possible, completing his sketches in colors immediately upon slaughter and dissection. With but one or two exceptions, the specimens that are used to illustrate the chapters on pathology in this report, were sketched in this manner *when perfectly fresh and before any post-mortem change, even in appearance, could have occurred*. The artist was strictly ordered to permit no deviation from nature in his sketches and colors. He has executed his task with exceeding faithfulness.

The artist, Mr. Robert Koehler, enjoys a just reputation for rare excellence in regard to truthfulness in anatomical delineation and coloring. His professional life having been spent in this kind of work, and Prof. Karl Bock's celebrated Atlas of Human Anatomy having been illustrated by his hand before he came to this country, he has continued to receive in New York the same confidence and patronage of the anatomists and pathologists that he enjoyed at Leipzig, where he was the assistant to Prof. Bock. As the volume of these colored sketches of morbid anatomy of the Texas disease in cattle must depend upon their truthfulness and the freshness of the specimens they are made to illustrate, this introductory note is due to the Committee's report, and to Mr. Koehler, the artist.

SUMMARY OF THE EVENTS AND THE PROGRESS OF INVESTIGATIONS IN
REGARD TO THE DISEASE.

As the details of all that relates to the arrival, inspection and care of infected cattle, are embodied in Assistant Commissioner Morris' report in the succeeding section, we need only state here, that in the prosecution of the Committee's duties in regard to the diseased cattle, it was necessary to give all possible aid to Dr. Morris, in providing for the slaughter and post-mortem examination of the cattle he condemned and ordered to be killed, or that were permitted to linger in quarantine until they died. It has also continued to be necessary, until December 1st, to maintain extensive correspondence to ascertain the history of herds and their movements connected with the manifestations of the disease; and it has also daily been necessary to take counsel together upon the results of these inquiries and the new events in the progress of the disease. Happily the contagious principle upon which the disease depends for its propagation in the North and West, has proved to be capable of repropagating itself only in a very limited and subtle way; but the very circumstances of this subtlety of the contagium has rendered it the more necessary to push on our inquiries and experiments the more assiduously while opportunity has been afforded. All of this labor may be briefly summed up as follows:

1. Every example of the disease within the reach of the committee of the Board of Health, or Assistant Commissioner Morris, has been promptly investigated; and, if the bullock was not recovering, the slaughter for post-mortem examination of the animal was provided for; or, if already dead, the proper expert inspection was made by two or more officers of the Board, Assistant Commissioner Morris being one of them. The total number of infected cattle and diseased carcasses so inspected and examined, between the dates of August 9th and December 1st, being between two hundred or three hundred. Upwards of forty (40) infected bullocks have been slaughtered and very minutely examined by this Committee in a definite and scientific manner.

2. Unceasing effort has been made during a period of nearly four months to discover and inspect every animal suffering from the Texas disease within the Metropolitan District. Assistant Commissioner Morris during this period has inspected many thousand cattle, and he sought the counsel and aid of this Committee daily.

3. All cattle found dead or dying from unknown or suspected causes in the city of New York, have been carefully inspected, and their internal organs examined under the direction of this Committee.

4. By an arrangement with the Superintendent of the New York Rendering Company, a corporation that has the contract for gathering and disposing of all dead animals from the city, the dying and dead cattle that were daily conveyed to the rendering dock, were reported and examined. In like manner all information received by the superintendent there was at once communicated to this Committee of the Board of Health.

5. Whenever a creature was found with this disease, the symptoms and progress of it were reported twice daily, and if brought to slaughter, all necessary preparations were made beforehand for taking and preserving specimens instantly upon killing the animal. No specimens were deemed suitable for analysis and for the artist's sketching unless obtained immediately at death, and brought under such study without delay.

6. A series of experiments to test the morbid effects of bile, liver and muscular tissue, used with food, was made under the care of Dr. F. J. Randall, an Assistant Sanitary Inspector connected with the Registrar's office. Dogs, rabbits and mice were the animals experimentally fed in this way. Other experiments were also made to ascertain the modes in which the infectious principle of the disease might be made to produce its morbid effects in healthy animals.

7. A series of special inquiries was made to ascertain the existence and nature of this infectious disease in freshly arrived Texan cattle; also preliminary inquiry upon this point, by extensive correspondence, was made before any of the Texan stock came under inspection of this Committee and the Sanitary Inspectors. The first of our inquiries upon this subject were addressed to Dr. J. H. Rauch, the Sanitary Superintendent of Chicago, and Prof. John Gamgee. After the lapse of about ten days, both these gentlemen replied by letter, the former from the Chicago stock yards, under date of August 22d, and the latter from Kansas City, under date of August 23d, assuring us that the disease had been found by them, respectively, in the Texan cattle at those places. Subsequent opportunities in New York enabled the Sanitary Inspectors to verify the correctness of the conclusions that had been communicated to us by Dr. Rauch and Prof. Gamgee.

8. Experimental culture (by "planting") of the spores of the morbid bile and blood of infected cattle was commenced in September, and continued until December, for the purpose of ascertaining the true nature of the fungus from which the spores are derived—that is, to ascertain the botanical characteristics and parasitical history of the cryptogam to which the spores that are found in the blood and bile belong. The chief results of these experimental researches are concisely presented by Dr. Stiles in the second part of his report.

9. By correspondence and inquiry, effort was made to ascertain if the contagium of the Texas disease is propagated, even occasionally, by the native northern cattle; and, quite unexpectedly, contrary at least to very positive assertions as well as to the general rule, instances were found in which the disease had been transmitted by native cattle.

10. Finally, the evidences of health and disease have been very carefully studied by Dr. Morris ever since his labors commenced in August, and by several Sanitary Inspectors during the latter part of Autumn, and, as far as time would permit, every week since the Texas cattle disease appeared in the vicinity of New York.

II. REPORT ON SANITARY INSPECTION, REGULATIONS AND MEDICAL OBSERVATION.

By MORRAU MORRIS, M. D., Sanitary Inspector, M. B. H., and Assistant Commissioner of the State.

RECORDS CONCERNING HERDS OF DISEASED CATTLE THAT HAVE COME INTO THE METROPOLITAN DISTRICT, OR UNDER THE OBSERVATION OF SANITARY INSPECTORS OF THE METROPOLITAN BOARD OF HEALTH.

To the Committee of the Metropolitan Board of Health for investigating the Texas Cattle Disease, and the State Commissioners for the prevention and control of Cattle Plagues:

Gentlemen—For more than four months my time has been exclusively occupied with the observations, inquiries and sanitary regulations relating to the Texas Cattle Disease within the Metropolitan District, and wheresoever you directed my services.

My report to you consists mainly of records. They are records of events so interwoven with matters of historical interest concerning this disease, that it seems advisable to present this statement of my labors so consecutively as to be both complete in itself, and entirely convenient for reference from other branches of your reports respectively. It seems impossible, in reporting to you the details and results of these labors, so to discriminate the particular duties that were performed by me as an officer under the Board of Health, from the duties which I daily performed under the authority of the State Commissioners and the special statutes relating to the cattle plagues, that it would be difficult for me to make a full and correct report, concerning either the former or the latter class of my duties, without at the same time actually recounting the entire history of events during this period of service; consequently this report is respectfully addressed both to the Board of Health and the State Commissioners. Were I to report to your honorable bodies separately, the two reports would be in every respect identical in substance.

In making this report, the following order will be observed:

1. The date and leading events in the duties of each day.
2. The record of whatever observations were made in the inspection of cattle, together with an account of whatever sickness occurred among the herds from day to day.
3. Such arrangement and classification of particular portions of these records as may be necessary for the convenient study of events connected with the disease.
4. Observation upon other kinds of diseased cattle in the New York beef market.
5. Remarks upon evils which were restrained and controlled and upon sanitary measures concerning cattle and beef in the New York market.

6. What is designed and what should be accomplished by sanitary inspection and control in regard to animals and meats offered in the Metropolitan markets.

7. What conclusions and results have been reached in my observations and experience in this work.

So far as the legal authority and influence of the Board of Health could be made available to meet the exigencies which occurred in consequence of the Texas Cattle Disease, the Board promptly exercised that power and wielded that influence. The State Commissioners for the suppression of cattle plagues have acted in the same spirit as that displayed by the Board of Health.

But it is a fact which seems to demand the attention not only of your commissions respectively, but also of the chief executive and the legislators of the State, that all the powers and the methods for procuring the needed sanitary inspection and control of markets, cattle and meats, have been only temporary expedients. Systematic and skilled inspection, under adequate laws of the State, should be established as an essential branch of sanitary government.

On the evening of the 8th day of Aug., 1868, I received the following letter, directing immediate investigation and report upon the facts.

[Copy.]

E. B. DALTON, *Sanitary Superintendent Metropolitan Board of Health:*

Dear Sir—Dispatches from Chicago indicate the existence of a cattle disease in the West, and intimate that some of the infected stock are on the way to this city, if, indeed, they are not already here. In the absence of other commissioners, Mr. Manierre and myself agree without delay one of your inspectors should be directed to repair to the districts where Western cattle are received, and to ascertain and report all the facts. It will require tact in the performance of this duty, doubtless, to find out anything in relation to this matter, as the interests of the butchers are all against any development of facts showing the presence of diseased cattle.

(Signed) Yours truly, GEO. B. LINCOLN, *President.*

Upon this letter from the President of the Board of Health was the following indorsement:

[Copy.]

OFFICE SANITARY SUPERINTENDENT,
METROPOLITAN BOARD OF HEALTH, August 8, 1868. }

Respectfully referred to Sanitary Inspector Morris for immediate investigation, and report in writing or by telegraph, if any facts be discovered which require it.

(Signed) E. B. DALTON, *Sanitary Superintendent
Metropolitan Sanitary District.*

I immediately visited the National drove yards, located at One Hundredth street, between Third and Fourth avenues. There were but few cattle present, and found none sick.

The next morning visited the same yards again, and finding none sick, I joined the President of the Board, Drs. Harris and Stiles, in a visit to the abattoir at Cummunipaw, where Mr. J. T. Alexander's infected cattle which Dr. Harris had examined the previous day, were being slaughtered and thrown into the rendering tanks.

Here we found that one hundred and forty-one of Mr. Alexander's herd, which had left Homer, Ill., on the evening of the last day of July, were being sacrificed at the rendering tanks in order to avoid all risks and public injury that might result from keeping them for sale in the market yards.

A large number of these cattle were evidently sick, as indicated by the following symptoms:

Attitude: An arched or roached back; head carried low down; ears drooping; eyes staring, with a dull, glassy appearance; gait tremulous, and staggering in the hind quarters; the feces hard, streaked with blood; urine copious, and bloody in appearance (*hematuria*); pulse, in the most marked cases, was found to be at about eighty, thready, and in some of the animals almost imperceptible; the respiration, in one marked case, was found forty in the minute—auscultation of the chest furnished no abnormal signs; the temperature of the rectum, in some of the most diseased, was found to be one hundred and seven degrees Fahrenheit.

A bullock in the last stage of the disease was slaughtered for thorough dissection, which was made by the medical gentlemen present. The following morbid appearances were noticed: The gastro-intestinal mucous membrane was marked by numerous ecchymotic patches; bile in abundance was found in the small intestines; the bladder was filled with bloody urine; the blood in a fluid condition, and imperfectly drained from the larger vessels; the muscles of a dark mahogany color, and unlike that of any normal and healthy flesh. Specimens of the morbidly affected tissues and fluids were taken by Drs. Harris and Stiles for analysis and microscopical examination.

Less than fifty of these cattle were slaughtered on this day (Sunday, the 9th August), and, by appointment, the medical officers who were present agreed to meet on a subsequent day and continue their dissection.

On Monday, August 10th, visited the slaughter-houses located in Forty-fifth and Forty-seventh streets, near East river; found no sick cattle or diseased meat. Visited the Bergen cattle yards, in company with Assistant Inspectors Howard, Wadsworth and Winslow, where we found several hundred cattle, but none of them exhibited any signs of the disease; thence we went to Communi-paw, where the slaughtering of Mr. Alexander's infected herd was in progress.

Mr. Lincoln, of the Board of Health, Gov. Marcus L. Ward and Dr. Harris were there by appointment for consultation. Several diseased cattle were inspected at slaughter; the temperature ranged from one hundred

and seven degrees Fahrenheit down to one hundred and two degrees.* Information was received that evening that a herd of infected cattle belonging to a Mr. Thomas would arrive at the Bergen cattle yards. Early next morning (Aug. 11th), accompanied by Sanitary Commissioner, Dr. Stephen Smith, and the Registrar of the Board, I visited the Bergen cattle yards just mentioned, and there saw some fifteen sick bullocks of the herd of sixty-six that had arrived at that place from Warren county, Indiana. A full history of this infected herd being embodied in the Committee's general report, I need not repeat any portion of it here.

Four of these Indiana cattle were carefully examined as to symptoms. The following points were noticed: General external appearance; coats rough, heads hanging low down, eyes staring and dull, ears drooping, gait staggering, with tremor of flank muscles; feces hard, small, covered with bloody mucous, urine dark and bloody; pulse one hundred and ten per minute, soft and feeble; respiration rapid, temperature at rectum one hundred and four to one hundred and nine degrees Fahrenheit. From one of these sick bullocks, bloody mucous was issuing from the nostrils. Three of the cattle were suffering from delirium, and though apparently frantic, were too feeble to do injury; they stood pressing their heads firmly against each other, or against the fence, their nostrils resting on or near the ground. The first figure seen on the right of plate No. 1, shows the appearance presented by the feeblest one of these delirious cases; the sketch was taken on the spot on the 13th August.† The muscles of the neck in one of these animals were exceedingly rigid on one side, and relaxed on the other, producing a kind of torticollis. The top of the head and base of the horns had an excessively high temperature. Professors Busted, Liautard and others of the Veterinary College of New York, having arrived during this

* I owe it to the State Commissioners to remark here that I have occasion to refer to the temperature records connected with my inspections of diseased cattle almost daily.

With much satisfaction and a justifiable pride, as regards the advanced and very practical application of the exact science of medicine and hygiene, I beg leave here to state the fact that soon after the organization of the Metropolitan Board of Health in 1866, Dr. Harris, the Registrar, furnished its library with the latest and best treatises on those epizootics and other diseases of animals used for food, and requiring the attention of sanitary officers, and that his office, which is a bureau of hygiene, as well as of vital statistics, has always been kept supplied with self-registering thermometers to aid in the diagnosis and study of disease when required. In all their inspections, the officers engaged in the study of the cattle disease have never failed to have with them their self-registering thermometers, as trustworthy aids to ready diagnosis. To Dr. Harris, for his thorough knowledge of hygiene and the collateral sciences, and to his habits of organization and thoroughness in the investigation of causes and results of disease, is mainly due the credit for the completeness of all this investigation and study of the Texas Cattle Disease.

† The signs by which the disease was characterized were deemed of sufficient importance to warrant the sketching and exact illustration of them by a good artist. This forethought of the committee was certainly very fortunate, for, notwithstanding the very extensive prevalence of this disease in the West, and elsewhere, these sketches which the Metropolitan Board of Health has preserved, are believed to be the only series in existence that is at all complete.

examination, and requested the privilege of selecting one of the sick animals for their own experiments, they were cheerfully permitted to take their choice.

Mr. McPherson, the superintendent of the yards, volunteered the information, that the residue of the infected herd were securely isolated in a pasture near by, where they would be kept until the authorities of New Jersey decided what should be done with them.

August 12th. In company with Dr. Harris and Sanitary Commissioner Dr. Stephen Smith, visited the Bergen cattle yards. Eleven head of sick cattle from Thomas' herd were selected and placed in quarantine for observation. Three of these being very ill, temperature records were taken as follows:

		Fahrenheit scale.	
No. 1. Mooley.	At 2 p. m.	107½	degrees.
No. 2. Brindle.	do	105	do
No. 3. Speckled.	do	107	do

Three others were in small yards, belonging to the same herd, one of which had a temperature of one hundred and ten degrees.

The fifty head, balance of the drove, were said to be placed in quarantine pasture near by, but were, in fact, surreptitiously removed, no positive trace of them having yet been discovered.

On August 18th, I received instruction from the Board of Health, through the chairman of their committee on cattle disease, to co-operate with that committee, and to give my time to the special duty of studying the symptomatology and clinical history of this affection as it appears in the herd yards. These instructions directed me to devote all my time to this duty, to make accurate notes of my observations, and to follow the directions of Dr. Harris, in my work under the committee.*

On the same day visited Bergen cattle yards in company with Dr. Stephen Smith, Sanitary Commissioner, and Drs. Harris and Stiles, all of the Metropolitan Board of Health, and Prof. Liautard, of the Veterinary College of New York, Gov. Ward, of New Jersey, and Mr. Koehler, the artist. On arriving at the yards, discovered that but four remained of the eleven placed therein the day previous. The other seven had either died or been slaughtered, and removed, it was said, to the rendering tanks.

Those remaining, being in a dying condition, were immediately slaughtered and post mortem examinations held. Dr. Harris, who directed the scientific investigations, had the following observations made:

* This promptitude of action by the Board of Health in meeting whatever exigencies arise has proved the surest means of preventing popular anxiety as well as protecting the public health. It has justly been remarked by one of the officers of the Board that "experience in the Metropolitan district has abundantly proved that the best way to prevent both pestilence and panic, is to know and prepare for the danger." (Notes on Cholera Prevention, addressed to Jackson B. Shultz, President Metropolitan Board of Health. By Dr. E. Harris.)



Plate I. Appearance presented by Bullocks, suffering from Texas Cattle Disease.

Sketched from nature, by ROBERT KNEELER.





Fig. 1. Bull.
Internal anatomy of the thorax.

NATURAL HISTORY



No. 1. *Mooley*. Weight estimated 1,500 pounds gross.

- Blood flowing from the carotids; temperature, 106½° Fahrenheit.
- Fat, very yellow, jaundiced.
- Muscles, dark mahogany color.
- Liver very large, fatty; weight, 23½ pounds, softened.
- Spleen very large, engorged with dark blood; weight, 9 pounds 2 ounces.
- Kidneys, dark color, congested; weight, 4 pounds 6 ounces.
- Heart, muscular tissue softened; weight, 5½ pounds.
- Gall bladder, distended, filled with dark, thick, flakey bile; weight, 3 pounds 10 ounces; bile, sp. g. 1.030; temperature, 86° F.
- Urine, dark, bloody, about 1 qt.; sp. g. 1.035.
- Colon, inner mucous coat, highly congested, with blood along the longitudinal rugæ.
- Small intestines the same as colon.
- Rectum, intensely congested, rugæ.
- Bladder, inner coat covered with bright red puncta.
- Lungs healthy; right weighed 7 pounds; left, 4 pounds.

No. 2. *Brindle*.* In a dying condition; slaughtered.

- Temperature of rectum, 106°; mouth, 106½° F.
- Nostrils hot, moist; tongue pointed and retracted.
- Blood of aorta at slaughter, 106°; sp. g. 1.039.
- Fat very yellow, or greenish yellow color.
- Muscles, dark red, mahogany color.
- Liver enlarged, softened, fatty; weight, 27½ pounds.
- Spleen engorged, softened to a pulpy mass; weight, 9½ pounds.
- Kidneys very dark; weight, 4½ pounds.
- Heart, muscular tissue softened; 6 pounds.
- Gall bladder, distended, with thick, dark, flakey bile.
- Bladder, distended, without about two quarts of a dark, bloody urine; sp. g. 1.020; inner coat of bladder covered with bright red puncta.
- Small intestines injected with bloody puncta.
- Rectum, highly congested in longitudinal strise along the rugæ.
- Cæcum, inner surface covered with large ecchymotic spots.
- Omasum, its leaves inflamed; dry, and contents hard.
- Abomasum, highly inflamed, ulcerated in its pyloric extremity.
- Posterior nares, slightly injected with bloody extravasation.
- Brain, slightly congested.
- Lungs, healthy; right, 5½ pounds; left, 4½ pounds.

No. 3. *Speckled*. Gross weight, 1,150 pounds; temperature of rectum, 107° F.; in a dying condition; slaughtered.

- Blood of aorta, temperature 107½° Fahrenheit.
- Liver, enlarged, engorged with blood, and softened.
- Gall bladder, distended, with thick, dark bile.
- Rectum, cæcum, and small intestines highly injected with blood, forming strise and ecchymoses along the margins of the rugæ.

* The appearance presented by the carcass of this animal is shown in plate 2, which was sketched by the artist as soon as the viscera were removed after killing the bullock. See plate 2.

Abomasum, highly congested, inflamed, and the pyloric extremity presenting large dark ulcers.

Kidneys, dark color, congested.

Bladder, filled with dark, bloody urine.

August 14th.—Visited Communipaw. The five cattle that were reserved for observation and treatment, through the kindness of Mr. Fitch and the superintendent, Mr. Payson, were this day placed in a lot where they had access to salt meadow grass, and were compelled to drink of the following mixture, which Dr. Harris had prescribed as an experimental remedy:

Cabotic acid, 12 ounces in crystals; glycerine, 4 ounces; bicarb. soda, 12 ounces. Mix. *Directions*—Dissolve or mix one ounce in 3 or 4 gallons of water.

This was readily drank by the steers.

The surface of the ground was liberally sprinkled with heavy oil of coal tar, mixed with sawdust.

August 15th.—At Communipaw. The five cattle under treatment appeared evidently improving; they drank about two gallons of the medicated water during the past twenty-four hours.

An ox, which had been in the same yard with the infected herd, was found dead in another yard. He was examined by the State Inspector, Mr. Henry Taylor, of New Jersey, and presented the same lesions as had been observed in the cattle dying of the cattle disease in Mr. Alexander's herd, viz: "dark yellow-brownish fat, muscles very dark red, bloody dark urine, enlarged liver, gall bladder filled with thick dark bile."

August 16th. This day, at Communipaw, one of the five under treatment was slaughtered for scientific investigation. The balance (4) appeared to be convalescent:

Temperature 102°.

Post-mortem: urine clear, normal, sp. g. 1.020, acid.

Spleen somewhat enlarged and engorged.

Liver, 11 lbs., somewhat softened, fat very yellow.

Kidneys, slightly engorged, paler than normal.

Abomasum, mucous coat slight spots of congestion.

Rectum, congested along the rugæ.

August 17th. Visited National drove yards, One Hundredth street and Third avenue. Found an ox lying sick, unable to rise. Temperature 106°, breathing very rapidly, panting, pulse too soft and rapid to count. No owner or claimant. Sent it to rendering dock. A post-mortem examination was made. Post-mortem changes had so obliterated evidences of disease as to make the examination useless, except that there was abundant evidence witnessed to show that this animal had died of a putrid blood poison.

Liver, enlarged, softened; weight 16½ lbs.

Gall, very thick, dark.

Bladder, 1 quart of urine, dark, bloody.

Kidneys, perfectly disorganized.

Rectum gangrenous.

Spleen, an enlarged, engorged, pulpy mass.

Abomasum, gangrenous.

Fat, greenish-yellow.

Muscles, darkened mahogany color.

Found an abandoned cow on First avenue, between Second and Third streets, in a dying condition. On examination at the rendering dock, disclosed a pleuro-pneumonia.

August 19th. Examined 270 head which arrived this morning at Bull's Head, in which lot were Mr. Pile's drove of 85 head, two of which were afterwards taken sick.

Received this day the following telegram from Albany:

[Copy.]

ALBANY, *August 18th, 1868.*

To HON. GEO. B. LINCOLN, *President Metropolitan Board of Health:*

Sir—Be pleased to send to Millerton on the Harlem railroad, Dr. M. Morris, to act as Assistant Commissioner under and pursuant to appointment, under chapter 740, Laws of 1866. There are diseased cattle at Millerton, and Dr. Morris is empowered and directed to carry out the suggestions of the Sanitary Committee of the Metropolitan Board of Health, as published in Saturday New York papers in relation thereto.

(Signed)

M. R. PATRICK,
Chairman of State Commissioners.

August 19th. I immediately upon the receipt of the foregoing order, proceeded to Millerton, Dutchess county, N. Y., arriving at about 6 o'clock P. M. on the same day.

On the morning of the 20th inst., having learned that a part of the sick herd had been sent to New York the day previous, numbering seventeen head, sent telegram to head-quarters to have them seized, but it proved too late, as they had been disposed of and could not be traced.

At Millerton, found a portion of a drove of cattle belonging to A. W. and Nathaniel Smith, of 73 Washington avenue, Albany, N. Y. This drove originally numbered sixty-five head, and left Albany on the 9th of August, traveling overland towards New York city. They appeared to be a mixed lot of cattle—Illinois, Indiana and others. On the 12th of August, twenty head of this drove were left at Copake, Columbia county; one of these died on the 17th August, after an illness apparently of about forty-eight hours. The symptoms, as described by eye-witnesses, were the same as those I had observed at Bergen cattle yards and Communipaw, viz: head low down, ears drooping, arched back, great debility, staggering gait, would not feed, finally lying down, unable to rise until death supervened. It was deeply buried. On the 18th August, forty-five head of this drove arrived at Millerton, Dutchess county, N. Y., twelve miles from Copake. Of these on the 14th, two died; 17th, one, and 19th, one; making the record of this drove thus far as follows: Five deaths—14th,

two died at Millerton; 17th, two died, one at Millerton and one at Copake; 19th, one died at Millerton.

On the morning of 19th August, the owner fearing still greater loss, shipped seventeen head of the infected herd for New York by the New York and Harlem railroad, leaving twenty-four head at Millerton, and nineteen head at Copake.

Two of those at Millerton are looking ill, the remainder appear to be well, but all being a suspected herd, were quarantined to be retained until all danger had passed. The dead animals had been buried in a lot adjoining the pasture where the cattle were found. These two lots of land were therefore set apart as quarantine ground, and the following order issued to Mr. William H. Barton, of Millerton, who was placed in charge:

MILLERTON, DUTCHESS CO., N. Y., *August 20th*, 1868.

TO MR. W. H. BARTON:

Sir—You will please retain, under your personal supervision, the twenty-four head of cattle belonging to A. W. and Nathaniel Smith, of Albany, in the two lots adjoining and belonging to the estate of Mr. John Campbell, where the cattle now are and have been pasturing. You will retain them for one month from this date, or until further order from the State Commissioners or their assistants. You will not allow any cattle to come within one thousand feet of the quarantine ground. Provide them with plenty of salt and feed if necessary. If any are taken sick, confine them in a separate enclosure from those that are well. All animals of this herd that may die are to be buried at least four feet under the surface of the ground, covered with lime or carbolic acid for disinfection. The lots where the cattle are, or have been, to be disinfected with carbolic acid.

By order of the State Cattle Commissioners.

(Signed)

MOREAU MORRIS,

Assistant Commissioner.

Proceeding to Copake, Dutchess county, the same day, the balance of the drove were found, numbering nineteen head, upon the farm of Mr. E. Van Benschoten. None of these presented any evidences of the cattle disease, but as they were a part of the infected herd, they were placed in quarantine. The same order (in substance) was issued to Mr. E. Van Benschoten as to Mr. Barton, at Millerton.

August 21st. Learning that there were sick cattle at Amenia, Dutchess county, I proceeded thither and found upon the dairy farm of Mr. Abiah P. Baylis, that out of a herd of thirty, nine had died during the four previous weeks. This herd consisted of twenty-seven cows, one bull and one pair of oxen; of these, seven cows, the bull and one ox had died. Three cows and the remaining ox were found sick with pleuro-pneumonia, and the symptoms, as described by Mr. Baylis and the attendants, led me to conclude that those that had died, were all victims of the same disease. During the illness of these cows, their milk had been regularly sent to New York city for consumption. Orders were immediately given, under the authority of the Board of Health, as its Inspector, that no more milk from the infected herd should be sent to New York city. The remainder

of the herd were placed in quarantine, upon Mr. Baylis' farm, under the supervision of Dr. Desault Guernsey, of Amenia, for observation and report, and a copy of the same quarantine order left with him as was given to Mr. Barton. Five more of this dairy herd were subsequently taken sick, making nine head which were put under treatment; all these finally recovered.*

August 21st. Returning to New York city, I immediately instituted a thorough inspection of all cattle in the yards of the National drove yard, at One Hundredth street and Third avenue, and continued such inspection daily as they arrived from any source.

August 24th. Two sick cattle were found at Bull's Head, in a drove belonging to Mr. S. D. Pile. These left Arrow Rock, Selene county, Missouri, on the 3d day of August, 1868, numbering 83 head, and crossed the Mississippi river at St. Louis; here the two sick ones were said to have been added to the drove, making 85 head in all. From St. Louis they were shipped by railroad to Buffalo, Albany, and New York city, and arrived at Bull's Head on the 19th instant. On the 22d, these two were observed to be ailing, refusing food, and continued getting worse; but all knowledge of their illness was carefully kept from me until the 24th inst., when they were seized and placed in quarantine hospital, under observation. Fifty head of this drove had been sold for slaughter, and I have no doubt, from subsequent information, that diseased ones were among them. Thirty-three head now remained. Of these, there were 17 head of Cherokee cattle, which did not exhibit any evidence of disease; they were allowed to be sold for slaughter. The balance of the herd, 16 native cattle, were placed in quarantine pasture, near King's Bridge, on the 25th August, where they were retained for four weeks, when, no further evidence of disease appearing among them, they were released.

August 25th. This day a post-mortem examination of one of the diseased steers from Mr. Pile's herd was held. Present, Drs. E. Harris, R. C. Stiles, and B. Howard, Assistant Inspector—all of the Metropolitan Board of Health. A valuation of \$30 having been fixed upon, he was slaughtered.†

*The treatment of these cases showed a remarkable result, viz: out of a herd of thirty head, eighteen were diseased; nine of these died before any treatment was instituted; the other nine all recovered under treatment.

The medical and hygienic treatment was as follows: The sick animals were placed in a small enclosure by themselves. Pure carbolic acid was placed in a large open-mouthed bottle, dissolved in water. This was held to the nostrils, and given by inhalation at short and repeated intervals. The heavy oil of coal tar, containing 70 p. c. of carbolic acid, was liberally sprinkled upon the yard where they were kept, thus presenting the fumes of the carbolic acid constantly. The feeding was low diet, plenty of water, salt, and out-door air.

† Regarding the history of the two bullocks of Mr. Pile's drove, which brought his 16 other native cattle under the suspicion that took them into quarantine, it was ascertained that Mr. Pile had purchased them three weeks prior to my quarantine order concerning the herd. He had purchased these cattle at East St. Louis, for the purpose of filling a car, as before mentioned, and they exhibited no sign of sickness until two days before I saw them. As they appeared to him ailing, he endeavored to dispose of them surreptitiously,

White steer, killed August 25th, 2 P. M., at One Hundredth street.
Been obviously sick thirty-two hours:

Temperature rectum, 107½° F.; respiration, 36; pulse, 76; nostrils, profuse mucous discharge, streaked with blood; anus appears dry and contracted; feces almost natural; urine bloody; animal balances himself by strongly twisting its head and neck to the left.

Post-Mortem Observations.—Temperature of blood, 107° F.; reaction neutral; temperature of liver, 17 minutes after death, 106°, and in the middle of this organ, 19 minutes after death, 107½°; appearance of subcutaneous surface, healthy; peritoneal cavity, its fat intensely yellow, cavity contained a large amount of bloody looking serum; gall bladder distended; bile, sp. gravity, 1.025, reaction neutral; urine, sp. gravity 1.009½, neutral; liver, healthy in color and consistence; weight, 18 pounds; kidneys apparently healthy; weight of one, 1 pound 6 ounces; of other, 1 pound 7 ounces; spleen, 6 pounds 2½ ounces, dashed with large ecchymoses upon anterior surface, the entire tissue being much engorged and easily broken down; bladder, especially at the *bas fond*, covered with ecchymotic spots; small intestines congested, presenting a general dark blush, no spots; lymphatic glands, in cellular tissue liver-colored, intensely yellow in center, with dark green towards surface.

The temperature record of the second steer, belonging to Pile's drove, is as follows:

August 24th, 105½° F.; August 25th, 105°; August 26th, 104°; August 27th, 104°; August 28th, 103° (chewing cud); August 29th, 103½° (appears dull, does not chew cud); August 30th, 103° (was bled this day one-half pint from the cervical vein); August 31st, 101°; September 1st, 101°; September 3d, 100½°.

August 25th. This day made report to the President and Sanitary Committee of the Board of Health, and to the State Commissioners, through Gov. Fenton, as follows:

NEW YORK, August 25th, 1868.

To His Excellency Gov. R. E. FENTON,

and the State Commissioners on diseased cattle:

Sirs—I have the honor to report that two cattle were found sick with the cattle plague at the National drove yards, New York city, on the 24th inst., belonging to a drove of eighty-five head, which left Arrow Rock, Selene county, Missouri, on the 3d of August inst., owned by Mr. S. D. Pile, of the aforesaid place.

The two steers, now sick, were bought in St. Louis "to fill a car" and came through with the drove by railroad by way of Buffalo and Albany. They arrived in the National drove yards 19th inst.

but fortunately they were discovered during inspection, and at once placed under quarantine restrictions. The presence of these sick cattle had already depreciated the value and interfered with the sale of the whole herd.

Facts which have since been communicated to the Board of Health, warrant the conclusion that these two sick bullocks of Mr. Pile's herd received their infection at or near the yards at East St. Louis, where he purchased them; hence, the period of incubation in them could not have been less than twenty days to the first appearance of obvious symptoms at the National drove yards.

Fifty head were sold immediately upon arrival, leaving thirty-three head; of these, seventeen head were Cherokees; they were selected out and allowed to be sold. Sixteen head of native cattle were removed from the yard to quarantine pasture, which I selected, near King's Bridge, on the "Dyckman estate."

The yards have been thoroughly disinfected.

August 25th. To-day held a post-mortem examination upon one of the two sick from Mr. Pile's drove, at which were present Assistant Commissioner Orton, Drs. E. Harris, R. C. Stiles, B. Howard, all of the Board of Health. The evidences of the disease were well marked.

In order to prevent the surreptitious movement of suspected and diseased cattle from the National drove yards, I have this day quarantined the whole of the yards, and ordered that no cattle be allowed to leave them without a proper inspection and permit, signed by the Assistant Commissioner.

The paramount necessity of protecting the public health, as far as possible, with the advice of the president of the Board of Health and its officers, have induced me to take this decided action with reference to this point.

Hoping it may meet your approval, I remain, respectfully,

Your obed't serv't,

MOREAU MORRIS,
Assistant Commissioner.

The following quarantine order was issued this day upon Messrs. Allerton, Dutcher & Moore, of the National drove yards, New York city.

NEW YORK, *August 25th, 1868.*

Messrs. DUTCHER, MOORE & Co., *National Drove Yards:*

Gentlemen—By virtue of the powers conferred upon me as Assistant Commissioner of the State of New York, in the act passed April 20th, 1866, chap. 740, and amended April 19th, 1867, with reference to infectious diseases of cattle, I hereby designate the whole of your yards and enclosures, located between Ninety-seventh and One Hundredth streets, and Third and Fourth avenues, New York city, as quarantine grounds.

You are hereby enjoined from allowing any cattle to leave said quarantine grounds, without special permit signed by the Assistant Commissioner.

Respectfully, MOREAU MORRIS.
Assistant Commissioner for the State of New York.

August 26th. Inspected this day, 1,486 head of cattle at Bull's Head, and made report to President Lincoln and Sanitary Committee of Metropolitan Board of Health, as follows:

NEW YORK, *August 26th, 1868.*

GEO. B. LINCOLN, *President of the Metropolitan Board of Health,*
and Committee on Diseased Cattle:

For your information, with reference to the progress, control and investigation of diseased cattle, I have the honor to present the following statement:

Learning the fact that a large number of cattle were expected to arrive at the National drove yards, by way of the Hudson River railroad, at two o'clock this morning, and fearing that some might escape the proper inspection before being slaughtered, a request was made of your president for a sufficient force from the

Metropolitan police to aid me in securing the inspection. This aid was kindly afforded by that department, and proved of great value, as no cattle arriving either at Hudson River railroad depot, or by Harlem River railroad, or any other inlet, have left the drove yards without a careful inspection. Measures had been taken previous to their arrival, under the authority conferred upon the Assistant State Commissioner, so that no cattle could leave the yards without such inspection and permit. Under this arrangement, I am happy to be able to say, that I believe no diseased cattle have escaped observation.

All that arrived at the drove yards underwent a personal inspection, and were found apparently in a sound, healthy condition. These numbered 1,101, and, with 393 which were yet in the yards from last market day, made a total of 1,494 head of cattle inspected this day. These cattle are from Missouri, Illinois, Indiana, Ohio, Kentucky, and this State; some of them from the Cherokee country.

One, which I have reasons for believing had been turned out of a slaughter-house near by, was found on the Third avenue, near One Hundred and Sixth street, very sick. He was placed in the hospital lot attached to quarantine, where he will be retained for observation.

The effect of this decided action, in the thorough inspection of all cattle arriving at this large depot for distribution, will be, that more care in the selection of droves, and the exclusion of any suspected of having disease, will be exercised at distant points. It will be very difficult to forward diseased cattle to this market by any of the usual routes from this time forth, as I learn, by recent advices, that at all the prominent stopping and feeding places competent commissioners and inspectors are constantly on duty.

Nevertheless, New York city presents so many exposed points at which cattle may enter and pass to the numerous slaughter-houses scattered throughout the Metropolitan District, where unscrupulous persons are ever ready to seize opportunities, and where it is almost impossible to maintain a thorough system of inspection either of cattle or meats, that I would respectfully and earnestly beg to offer the following suggestion: In order to be able thoroughly and efficiently to certify that no diseased meat either be slaughtered or offered for sale, the business of slaughtering must be confined to fewer points, and at such places as afford the largest facilities for thorough observation; that no meat be allowed to be sold without proper certificate of inspection.

In pursuing investigations with reference to this important subject, as respects the health of the people of this city and Brooklyn, most startling facts appear, and to my own mind afford a reasonable conclusion as to the variations in the death-rates, as furnished by your Registrar from time to time.

Not only diseased beef, but other meats, as well as vegetables and fruits, must share the responsibility.

In order to secure the inhabitants of the Metropolitan District from the danger of purchasing diseased meats, it is *absolutely necessary not only that animals should be inspected upon the hoof, but that a more careful and thorough examination of internal organs, while being dressed for market, should take place.** It is a well

* Such inspection is now pursued at the Communipaw abattoir, under the authority of the State of New Jersey, by a competent and careful inspector, and it will at once tranquillise the public fear of diseased meat from that point, and secure a healthy supply.

known fact that a large proportion of the meat slaughtered and inspected under Levitical law for the use of our Israelitish population, is condemned as respects its use by them, but sold at equally high prices for use by Gentiles.

Up to the present moment no new cases have been discovered.

Respectfully submitted,

MOREAU MORRIS,

Sanitary Inspector M. B. H.

To-day a red ox was found abandoned on Third avenue, near One Hundred and Third street, evidently dropped out of some drove going to Bull's Head, from the landing place on Hudson River Railroad, at One Hundred and Twenty-fifth street. It was placed in quarantine hospital.

Temperature 106° F. Very feeble; feverish, with staggering gait; all the white of the eyeballs deeply jaundiced; tongue dry; nostrils dry; horns hot; is uneasy; lies down often.

August 27th. Temperature 105° F. The animal evidently sinking; unable to stand, dying, and at 8:30 he was dead; sent to the rendering dock; examined within six hours, and found to present the well defined lesions belonging to the Texas Cattle Disease.

Another ox was taken to the rendering dock this day in a surreptitious manner, with the hope of not being discovered. This ox came from a slaughter-house in Stanton street. An examination revealed the same cause of death as in the former case. This animal was purchased at Bull's Head on the 30th inst., during my absence from the city, and had been kept in a dark shed near the slaughter-house in Stanton street during the interval.

To return to the daily record of duties, I need to present in this place the results of post-mortem examinations which were made upon the four remaining bullocks of Mr. J. T. Alexander's herd, which had become convalescent at Communipaw. One of the five sick bullocks which had been generously set aside by Mr. Fitch (the agent of Mr. Alexander), for the uses of the Metropolitan Board of Health in studying the disease, was slaughtered on the 17th, and results were observed which have been described in the general report by Dr. Harris. It remains to present in this place the post-mortem inspection of the remaining four. They had been about fifteen days apparently convalescent, and had been three or four days very sick, with all the symptoms of the disease. Efforts were made to obtain temperature observations daily, but such observations were made with great difficulty, owing to their restless and wild state; yet on the 9th, 10th and 11th, the temperature was taken once or more daily in the rectum of each one, and was found to average about 105° F.; but in no one did it reach 107° F. The post-mortem dissection of these four bullocks commenced at 2 P. M.

These four bullocks were seen to exhibit the usual symptoms of the Texas disease at the first and second visits which the medical officers made to the yards at Communipaw, viz: on the 8th and 9th of August. The lopped-

horn steer, which was slaughtered on the 16th, was, at the former dates, believed to be rapidly approaching a fatal result, but these four others were only then beginning to exhibit symptoms. They had been carefully fed, and in their drink each of the bullocks had taken a little more than half a drachm of carbolic acid (Calvert's best crystallized) in two thousand parts of water, as before mentioned.

Record of Post-Mortem Examinations.

Steer No. 1. Temperature of blood, 103° ; thirty-two ounces coagulated firmly in twelve minutes.

Temperature of liver, 102° in center of right lobe, fifteen minutes after death.

Urine, specific gravity 1.009, clear, slightly alkaline; no albumen.

Fæces thin, but natural.

Lungs healthy.

Liver healthy; weight, $12\frac{1}{2}$ pounds.

Gall bladder healthy.

Abomasum, over a large space, signs of recent great congestion. All this part had a whitish appearance, as if the congested membrane had been recently acted upon by carbolic acid. There were two or three superficial ulcers scattered about, having the same appearance as if almost healed. The whitish appearance was not attributed by the gentlemen present to the action of the carbolic acid which the animal had swallowed while under treatment; it was considered, rather, to consist of epithelium scales cast off during the progress of the reparative process, which seemed to be rapidly advancing.

Steer No. 2. Temperature of blood, $103\frac{1}{2}^{\circ}$ F.

Temperature of liver, 15 minutes after death, $101\frac{1}{2}^{\circ}$.

Urine, specific gravity, 1.022; alkaline; contained a good deal of albumen.

Kidneys remarkably healthy.

Heart healthy.

Liver weighed $15\frac{1}{2}$ pounds.

Abomasum suffused with a moderate blush, and sprinkled with miliary white patches.

Mucous membrane darkly eroded in small patches, but evidently healing in pyloric extremity.

Rectum shows signs of recent congestion, but seems now very nearly natural.

Steer No. 3. (A tall, lean animal.)

Temperature of the blood at death, $103\frac{1}{2}^{\circ}$.

Temperature of middle of liver, 15 minutes after death, 103.75° .

Urine, specific gravity, 1.025; neutral, inclined to alkaline.

Kidneys healthy.

Liver weighed 13 pounds.

Spleen weighed four pounds, being engorged and enlarged.

Stomach and contents in good condition.

Rectum gives evidence of recent congestion of great extent, which now is quite limited.

Steer No. 4. Temperature of blood $103\frac{1}{2}^{\circ}$; coagulated in 15 minutes.

Temperature of right lobe of liver, 15 minutes after death, $103\frac{1}{2}^{\circ}$.

Urine, specific gravity, 1.005; neutral, or slightly alkaline; no albumen.

Liver weighed $11\frac{1}{2}$ pounds.

Spleen weighed 3½ pounds; much engorged and slightly softened.

Abomasum showed evidence of recent disease; the papillæ much enlarged at valvular portion.

About three inches from pylorus are seen recent and deep erosions cicatrizing.

August 28th, 29th and 30th. Inspected cattle at Bull's Head, as usual. None found sick.

Early in the morning of the 30th, Dr. Harris, and Prof. Copeman, a veterinary surgeon, joined me at the National drove yards, for the purpose of taking specimens of blood from the cervical veins of the remaining sick ox of Mr. Pile's herd. The temperature that morning was 108° Fahr. Four vials, containing two ounces each, were taken. The result of the analyses, as given by Prof. Chandler, can be seen in the general report. This animal seemed to improve temporarily after the loss of this small amount of blood, for his temperature on the subsequent morning was found to be 2½° lower.

August 31st. The following notice was issued in the morning papers of New York city:

TO DEOVERS AND BUTCHERS.

Under the authority conferred by the laws of the State of New York, enacted April 20th, 1868, chapter 740, section 9, I hereby order and direct, that all beef cattle and cows landing or arriving within the limits of the city of New York, be yarded at the quarantine yards, One Hundredth street and Third avenue, Eleventh avenue between Fortieth and Forty-first streets, city of New York, there to be properly inspected. All cattle found traversing the streets of this city, without a permit signed by the Assistant Commissioner, will be seized and taken to the quarantine yards for inspection, unless so far diseased as to require other disposition. This order to take effect on and after Wednesday, the 3d day of September, 1868.

(Signed)

MOREAU MORRIS,

Assistant Commissioner.

The following supplemental order was issued on the 3d September, 1868:

NOTICE TO OWNERS OF MILCH COWS.

A temporary quarantine yard is hereby established for milch cows at Chamberlin's yards, Nos. 70 and 72 Robinson street, where they will be inspected daily, and permits given.

Blank permits were provided, of which the following is a copy:

No.....

NEW YORK, 186 .

I hereby certify that I have inspected head of cattle belonging to, and allow them to leave quarantine yard.

.....

Assistant Commissioner.

These were furnished whenever cattle left the quarantine enclosures, and proved to have been of the utmost value as time progressed.

Finding that cattle were surreptitiously taken to slaughter-houses with-

out the proper inspection upon the hoof, on the 31st August, 1868, the following communication was addressed to the President of the Metropolitan Board of Police through the President of the Metropolitan Board of Health:

Hon. THOMAS C. ACTON, *President Metropolitan Board of Police*:

Sir—Deeming it essential to secure the support and co-operation of your police force in order to enforce the provisions of the order herewith enclosed (notice to drovers and butchers), which I find necessary to issue to secure a proper inspection of all cattle entering this city, that the spread of infectious disease among cattle, and the sale of diseased meat for food, may, as far as possible, be prevented, I would respectfully solicit of your honorable Board that an order be issued to its officers, that all cattle found traversing the streets of New York city without a permit signed by the Assistant Commissioner, be seized and brought to the quarantine yards for proper inspection.

Having found, by actual experience, during the past week that it is impossible to secure a proper inspection of cattle arriving at the market, under present circumstances, and from the well ascertained fact that many diseased animals are taken to slaughter-houses without proper inspection, I am compelled, by the great responsibility which is imposed upon me under the law of the State Commission, and by the requirements of the Board of Health, as its officer, to take such measures as will secure, as far as possible, a proper guarantee that no infectious disease shall spread among cattle, and that diseased animals shall not be slaughtered for food in this city.

Your co-operation to this end is therefore earnestly and respectfully solicited.

An early reply is desired, that prompt and decisive measures may be taken.

Very respectfully,

Your obedient servant,

MOREAU MORRIS,

Assistant Commissioner for New York State.

The Metropolitan Board of Health, on the 2d September, 1868, at a regular meeting adopted the following:

Whereas, Assistant Commissioner Dr. Moreau Morris has found it necessary to establish two quarantine yards in the city of New York, for the purpose of securing the needed sanitary inspection of all cattle arriving within the city limits:

Resolved, That the Metropolitan Board of Health hereby expresses its unanimous approbation of this official action of Assistant Commissioner Morris, and requests the Metropolitan Police Commissioners to enforce strict obedience to the orders and regulations which Dr. Morris has established concerning such quarantine inspection.

September 1st. At Bull's Head inspected 511 head of cattle. In one drove of 27 head, belonging to Mr. Wm. Thompson, from Illinois, there was a sick ox; he was removed to hospital, and kept under observation for several days, until he recovered and was discharged.

September 3d. Commissioners Gen. M. R. Patrick and J. Stanton Gould, and Assistant Commissioner Dr. Manlius Smith, their secretary, met Dr. Harris and myself for conference, and on the 4th visited Communipaw (New Jersey), and the New York Rendering Company's dock, and







FIGURE 1. The heart of a human being, showing the coronary vessels.







terminated the day at National drove yards, One Hundredth street, where we slaughtered and dissected the remaining ox of Pile's herd. Present at the post-mortem examination: Drs. Harris, Stiles, Chandler, Howard and Mr. Koehler, the artist, besides the Commissioners and Assistant Commissioners before mentioned.

This animal had seemed to be but lightly attacked. The bloody urine, staggering gait, and increased temperature being the main evidence of disease during life, while the chief evidence of disease, as discovered at post-mortem examination in this case, consisted in the deep discoloration of the muscles and the fat; the presence of extensive erosion and sloughing in the pyloric portion of the fourth stomach, and in the usual conditions which have attended this disease in the lesions of the liver and spleen; and most of all, in the microscopical evidence which had been obtained on the 30th of August, from blood drawn from the cervical vein and examined by Dr. Stiles; also, the blood taken at the time of slaughter.

September 9th. There arrived at Bull's Head, a car-load of nineteen head of cattle, from Illinois, bought by Baker, at Albany, and shipped to care of Bright & Fagan. The whole lot not appearing well, were placed in quarantine hospital. The temperature of all was taken.

At 3:30 found an ox from this car-load unable to rise, presenting the prominent symptoms of the cattle fever: head drooping near the ground; eyes staring, dull; horns cold; body hot; breathing rapid; pulse very feeble, unable to count it; coat rough, covered with flies; temperature of rectum $106\frac{1}{2}^{\circ}$ F. Killed at 6:30 P. M. same day at rendering dock.

Temperature, $105\frac{1}{2}^{\circ}$.

Temperature of blood at slaughter, 103° .

Temperature of liver, 15 minutes after death, 106° .

Bladder contained 30 ounces of "black water;" much distended; mucous surface of neck of bladder oedematous; inflamed.

Rectum contained small quantity of hard, rolled dung; the mucous membrane engorged with black blood; rugae striated with blood.

Abomasum, whole inner surface a dark purplish color; pyloric extremity deeply eroded over about one-twentieth part of the surface; the erosions also found on the larger folds; the upper part of the intestine in a like condition.

Kidneys enlarged; color very dark; engorged with dark blood throughout.

Gall bladder distended, with thick, dark, ropy bile.

Liver weighed $23\frac{1}{2}$ pounds, without fat or gall bladder; fatty, engorged with blood.

Heart large, flabby; blood extravasated between muscular and mucous surfaces.

Fat a dark, greenish-yellow, without consistence.

Muscular tissue very dark mahogany color; soft and flabby.

On this date (September 9th), temperature observations were commenced upon this herd of Bright & Fagan's. (Mr. Baker, of Albany, is said to be the owner and shipper.)

TEMPERATURE RECORD of nineteen head of Cattle shipped to care Bright & Fagan, 5th September, 1868, by Baker, of Albany, from Buffalo. Arrived at Bull's Head, N. Y., September 9th.

No.	Sept. 10.	Sept. 11.	Sept. 12.	Sept. 14.	Remarks.
1	102 °	102 °	101 °	101½°	This lot of 19 head, losing one, was discharged from hospital on the 18th September, well.
2	102½	102	102	101½	
3	102½	101	101	101	
4	101½	102½	101	101	
5	102	102½	101	101	
6	102½	102	100	101	
7	102½	103	102	101½	
8	102½	102½	102½	101½	
9	103	104	101	101½	
10	103	103½	101	101	
11	101½	102½	101	101	
12	102½	102	101½	101½	
13	102½	102	101	101	
14	102½	102½	101	100½	
15	104	102½	101½	101	
16	102½	102	101½	101	
17	102½	102	101½	101	
18	.....	.....	104	101½
19	107½	slaughter.	.....	.....

September 14th. Mr. Dayton, the Inspector, and myself, found at One Hundreth street a bullock of the Bright & Fagan herd, with symptoms of the disease, bloody urine, &c. He was slaughtered at 4 P. M.

Record of Post-Mortem.—Temperature of rectum before slaughter, 107° F. (Temperature at 9 A. M., 107½°.) Temperature of blood flowing from aorta, 107°; temperature of liver, nine minutes after death, immediately upon opening the abdominal cavity, and plunging the thermometer in the center of the liver, 108°; weight of liver, 18½ pounds; color of this organ, a mottled and ochrey *cast au lait* color. Specific gravity of blood, 1.021; gall bladder excessively distended, and containing 3 pounds, 10 ounces of thick flaky bile; specific gravity of this fluid, 1.018. The spleen weighed 5 pounds, 2 ounces, and was ecchymotic in appearance, and almost diffuent in its substance. The kidneys weighed 1 pound, 8 ounces each.

September 12th. Early in the morning, police officers of the First precinct telegraphed to Dr. Harris' residence, and to the office of the Board of Health, that twelve cattle had died during the night at Pier 12, East river.

Taking Captain Lord, of the Sanitary squad, Dr. Harris proceeded to that pier, and to the steamer "Fah Kee," which lay on the north side of that pier, and at its outer end, and they there ascertained that fourteen bullocks had died on board or upon the dock, after being taken off the ship, during the night and morning. There were twenty-six remaining alive; these were being disembarked. It was immediately ascertained that this herd of forty fat bullocks had been purchased and driven down from One Hundreth street during the previous day (September 11th), and that

they had been carefully put on board the "Fah Kee" before dark; that the portion of the ship in which they were placed was the main-deck, forward of the engine; that they had been purchased by a Mr. Harvey, the contractor who supplies the Bermuda market, for use of the troops, &c., but that they had undoubtedly come from one or two droves recently arrived from some point west of Toledo *via* Buffalo.

The twenty-six surviving bullocks were ordered to be carefully driven to the Battery to remain until sunset, as the day was excessively hot.

I inspected these cattle at the Battery, and ordered them to be removed to Bull's Head during the cool hours of Saturday night and Sunday morning, and took steps immediately to discover whatever could be ascertained concerning the origin of the herd. Found that they came from Illinois in a drove of one hundred and eight head, brought by "Farlow," and the whole lot were bought by Joseph Williams and William Thompson, in Albany.

Before night of the 12th fourteen head were dead, and during the following two days three more died, making seventeen in all dead out of the lot of forty head. The remaining twenty-three head were placed in hospital at the Bull's Head until the 17th, when they were removed to quarantine pasture near King's Bridge, where they remained until 8th October (three weeks), when they were released, being entirely convalescent, and appearing to be well. On the 12th October following they were sent to Bermuda, and arrived in good condition.

Post-mortem examination revealed the cause of death unmistakably as being of the Texas Cattle Disease.

The following is a concise abstract of notes made in ten of the post-mortem examinations which were held September 12th, 13th and 14th, upon the "Fah Kee" cattle:

No. 1. Dissected at 5 p. m., six hours after death. Died at 11 a. m., soon after being taken out of the vessel.

The temperature at 10½ a. m., as examined in the presence of Dr. Harris, half an hour before death, at pier 14, was 110° Fahr.

On post-mortem examination, the spleen was found normal in appearance; weight, 1 pound 7 ounces. Urine, specific gravity 1.019. Weight of liver, with gall bladder, 14½ pounds.

No. 2. Weight of liver, without gall, 14 pounds. The spleen and kidneys were disorganized.

No. 3. The paunch and diverticulum moderately filled with undigested materials. The omasum and abomasum nearly empty. The maniplies of omasum have perfect papule, but their blood vessels are deeply injected throughout with extravasation of disorganized blood vessels beneath the mucous membrane in several of these maniplies. The abomasum shows throughout the whole pyloric portion cicatrized ulcerations, but the membranes are so much altered since death that the full extent of these changes are not easily described.

No. 4. Exhibits more extensive erosions and recent cicatrices than No. 3. The abomasum was distended with black blood and some of the ordinary contents.

No. 5. Resembles No. 4 in every particular. Recent cicatrices covering tubular portion of the abomasum from the pylorus back to the folds.

The kidneys of the whole three were in a state of diffuent decomposition. Two patches of the folding or omasal portion of the abomasum appear to have been gangrenous before death; deeply ecchymosed if not gangrenous.

No. 6. Was like No. 3 in every respect.

No. 7. Is the red bullock seen alive by Dr. Harris at the vessel, and whose temperature at rectum was 108° in the moribund state, at $10\frac{1}{2}$ A. M., yesterday.

Post-mortem at 11 A. M., 25 hours after death. Stomachs in a fair state of preservation. The abomasum contained a small amount of ordinary material, and about a pint of thick, tarry blood. There were recent and partial cicatrizations and extensive erosions throughout the tubular portions of this stomach. The liver and kidneys were of a chocolate color, containing a little blood.

No. 8. Is the bullock Dr. Harris saw rescued from the water [into which it fell while being lifted off from the deck of the "Fah Kee"]. This bullock was slaughtered at the rendering dock, when in the moribund state. The temperature (immediately upon opening the abdomen), in the fat of the kidney, was 103° , and in liver, $103\frac{1}{2}^{\circ}$; the stomachs were moderately filled. The omasum showed no extravasated blood, but the epithelium peeled off readily at every point. The abomasum contained but a small amount of its ordinary material, and this was mixed with extravasated blood, or the coloring matter of the blood. The rustled or folding portion presented upon several of its margins and folds long patches, erosions, and sloughs, and throughout the entire circumference of the upper portion of the pyloric or tubular section, old erosions partially healed or recently cicatrized, studded the surface. Specimens were saved.

September 14th. Slaughter and dissection of two that survived to this date.

No. 9. Steer from vessel (that had fallen out of drove at Fourteenth street at 11 P. M., September 12th), killed at 4:45 P. M. Temperature of rectum just before slaughter $100\frac{1}{2}^{\circ}$. Temperature of blood at slaughter, $101\frac{1}{2}^{\circ}$. Temperature of liver, 15 minutes after death, $101\frac{1}{2}^{\circ}$. The rectum, commencing two inches from the anus, on its internal aspect, presents two deep ulcers; one extending five inches in the direction of the longitudinal rugæ; another extending about an inch. Weight of liver $22\frac{1}{2}$ pounds. Spleen engorged and enlarged, weighing 3 pounds.

No. 10. The steer from Robinson street (fell out of the drove when being driven up from the Battery, and was allowed to remain until this hour for slaughter). Liver, $22\frac{1}{2}$ pounds. The abomasum contained patches of the characteristic erosions, some recent, and some nearly healed.

The tubular rugæ of rectum engorged throughout their whole extent.

September 15th. During the inspection at Bull's Head this day, a sick steer was discovered in the grove belonging to Mr. P. F. Cary. Temperature of rectum, one hundred and seven degrees Fahrenheit. A valuation of eighty dollars, contingent upon conditions to be discovered, having been made, he was ordered to be slaughtered. The temperature record of this steer this day was as follows:

8 o'clock A. M., 104° Fahr.; at 1 P. M., 105°; and at 1:30 o'clock P. M., he was slaughtered in presence of several Inspectors of the Board of Health, who had been detailed this day to make investigations in the slaughter-houses, with reference to diseased animals and meats. Temperature of blood flowing from carotids, 106½° F.; of liver, fifteen minutes after death, 105½° F.

Post-Mortem Appearances.—Omental fat, brownish yellow; other fat, lighter yellow; muscular tissue, dark red.

Liver weighed 16½ pounds, and presented excessive fatty degeneration, engorged with blood, softened.

Gall bladder distended, with thick, dark flaky bile.

Urine normal.

Abomasum: upon mucous surfaces, dark, irregular shaped, elongated erosions, some in process of cicatrization, and upon the pyloric portion, several large cicatrices were seen, where the eroded surface had healed; spleen enlarged; weight 2½ pounds, congested.

Kidneys engorged with blood, color dark; weight of both, five pounds.

Rectum presented a few points of inflamed rugae.

Omasum, papillae contracted; surfaces dry, filled with hard cakes of food.

September 17th, 18th, 19th, 20th. Inspected cattle at Bull's Head, and also made examinations at slaughter-houses with reference to diseased animals, with the detail of Inspectors of the Metropolitan Board of Health. The results of these inspections were reported to the Board of Health on the 22d day of September, in detail.*

September 24th. A dead steer was sent to rendering dock from Bull's Head that was found dead in the yard, having arrived from Albany the day previous. He was examined on the 25th at the dock.

September 25th. Quarantined sixty-nine head of Texas cattle at Bull's Head, owned by Henry Livingston, looking badly; some suspicion of disease among them. They were released on the 28th, finding none sick.

This day removed to hospital three steers, one white, owned by Westheimer & Myers; released on the 28th.

Same day, two more, red and white, belonging to Mr. D. Adler; white released on the 28th.

Slaughtered a red steer at Bull's Head, owned by Mr. V. Samuels, valued at forty dollars. Also slaughtered another steer at same place, owned by David Adler.

The first steer had been sick in hospital for several days, and his temperature taken as follows (he had a persistent cough, dullness on percussion over the lungs, with submucous rale):

Temperature Observations.

	Morn.	Noon.	Evening.
23d	105 °	.....	104 °
24th	103½°	104 °	104½°
25th	102½°	104½°	103 °
26th	103½°	Slaughtered.	

* An abstract of the report here referred to is published in the report of the Metropolitan Board of Health for 1868. See Appendix.

Temperature of blood at slaughter, 105° F.

Lungs adherent to pleura; pneumonia in both lungs; pleuro-pneumonia, old phthisis, and also the peculiar lesions of convalescents from Texas disease in liver, spleen, abomasum and rectum.

The second case examined was slaughtered in the dying state, and presented typical conditions in all the internal organs. Prof. Law, of Cornell University; Dr. Harris and Dr. E. H. Janes, of the Metropolitan Board of Health; the artist, Mr. Koehler, and many others were present.

Bullock No. 1. Killed at Bull's Head, September 26th, at 2:10 P. M.

Temperature of liver, eighteen minutes after death, 103½°; weight, 23½ pounds. Spleen very large, weighing 8 pounds 14 ounces, and its length 2 feet 6½ inches, and 8 inches wide.

The duodenum inflamed and cedematous through its whole extent, and its mucous membrane soft—so soft that it was scraped off by lightly passing the nail over it.

The ductus communis choleducus, on opening, was found to be inflamed throughout, and having longitudinal bloody streaks, like fresh ecchymoses of blood; at one point was found what seemed to be a little ulcer recently sloughed. One kidney weighed 2 pounds 13 ounces; the other, 2 pounds 14½ ounces.

These viscera were sketched, on the spot, by Mr. Kohler. The blood and bile were subjected to chemical analysis.

No. 2. Temperature of blood of aorta, at death, 105½°. Temperature of liver, fifteen minutes after death, 106°; the liver was but little above the normal size. The spleen weighed two pounds and three-quarters. The bile presented only slight characteristics of the disease. The conclusion was that this bullock was convalescent when attacked with pleuro-pneumonia. The disease in the chest was very extensive, and would necessarily have proved fatal in the course of a few days, owing to the great effusion in the pleuritic cavity.

September 27th. Visited Communipaw with Prof. E. Law, Drs. E. Harris, E. H. Janes and others, and witnessed the slaughter of several Texan cattle.

Dissections of ordinary Texan cattle at Communipaw, September 27th, that presented an unhealthy appearance while living:

Bullock No. 1. Estimated gross weight of bullock, 1,500 pounds. Temperature of blood at slaughter, 100°. Abomasum, folds normal in appearance, presenting a few slight recent abrasions in the lower section of the folds, and a few old cicatrices. The pyloric portion, like the folds, normal in color, soft, marked extensively over the whole tubular section with cicatrices and old sloughs, most of them extending longitudinally upon the rugæ. The length of the cicatrices varies from an inch and a half to a quarter of an inch, a few not yet covered with epithelium. The spleen normal. The rectum perfectly healthy.

No. 2. Spleen large, but natural in appearance.

No. 3. Spleen rather large, though healthy in appearance. The abomasum, color of mucous membrane normal.

No. 4. Spleen rather large, and darker than natural. Extensive old cicatrices of

the abomasum, about one-sixth of the whole tubular portion marked with these cicatrices.

No. 5. The abomasum—the color of the mucous membrane over the folds rather darker than natural; mucous membrane soft, but untouched by any disease, so far as its present appearances are concerned. The tubular portion, covered over about one-fifth part of its surface with cicatrices; only a few of these have yet received an investment of epithelium.

No. 6. The abomasum—very similar to that of the others, with congestion of the folds, presenting cicatrices and a few sloughs near the pylorus, one of which had extended down to the muscular structure, much contracted in circumference, healing not yet completed.

No. 7. Shows no evidence of having suffered from the disease. The abomasum showing venous engorgement. Spleen smaller than in actual disease.

No. 8. Abomasum shows the common erosions with black surface. The pyloric portion exhibits the erosions, but somewhat more convalescent than the others.

No. 9. Temperature of blood at slaughter, 102°.

No. 10. Temperature of blood at slaughter, 99°. The ductus communis choledochus was examined and found thickened. The abomasum contained some extensive erosions; some in the pylorus. The spleen was contracted in shape and very dark colored.

No. 11. Abomasum exhibits highly congested venous engorgement, with extensive old erosions; extensive cicatrices of the pyloric portion.

These eleven post-mortems were made for the purpose of witnessing the condition of the viscera, etc., in a herd that had arrived by way of Abilene, Kansas, and which had been pastured for two months in Illinois without any discoverable signs of infection of disease, except that a few of the steers had a sickly and emaciated appearance.

September 28th. Inspected cattle at Bull's Head; released 69 head of Texans, belonging to Henry Livingston, in quarantine for two days.

October 6th. In examining cattle at Bull's Head found a white ox in yard, belonging to S. B. Richardson. He came from near Lafayette, Indiana, in a drove of 174 head bought of Clafner, at Buffalo; 57 head came to New York, and 117 went to Bergen, New Jersey. When found, this ox lay groaning in distress; rectum protruding, very red; making constant and painful efforts to defæcate, without being able to pass anything; restless, lying down, and rising frequently; going to the trough for water every few minutes. Removed to hospital; temperature 104½°. He was kept under observation; recorded the following temperature, Fahrenheit scale:

October 6th.....	104½°
do 7th.....	104½°
do 8th.....	104½°
do 9th.....	104½°
do 10th.....	103½°
do 11th.....	103 °

The owner supposing him to be suffering from constipation (he did not chew any cud during the six days), was allowed to treat him as he desired. Injections per rectum of various kinds were resorted to, but without relief. On the 11th October, showing evident signs of collapse, he was valued at \$40, and slaughtered in presence of Drs. S. Smith, E. Harris, E. H. Jones, F. J. Randall and myself, together with Mr. Koehler, the artist, and many others.

The notes upon this case, taken at the time of slaughter, are as follows:

Respiration 26 per minute. Temperature of rectum, $103\frac{1}{4}^{\circ}$. Slaughtered at eight minutes past 11 A. M. Temperature of blood flowing from aorta, 101° ; temperature of rectum, $100\frac{1}{4}^{\circ}$; temperature of liver, 100° . Specific gravity of blood, 1.055.

For fifteen minutes after death the blood from the aorta remained fluid; began to coagulate twenty minutes after flowing from the aorta. Spleen, 2 pounds $11\frac{1}{2}$ ounces. Liver, 18 pounds 4 ounces, divested of the bile and gall bladder. It appeared fatty throughout. (Subsequent examination proved that, like the liver of the bullock that was slaughtered on the 26th September, the morbid alteration consisted as much in a "waxy" degeneration, as in the fatty deposit.) Minute biliary vessels visible everywhere, the color resembling "*café au lait*" of an ochre hue.

This is one of the few chronically diseased cattle that, after ineffectual attempts at convalescence, became deeply jaundiced and anæmic. The spleen, the liver, the blood, the bile and the fatty and cellular tissues bear unmistakable marks of the disease. Dr. Harris had the artist sketch the morbid appearances. (See plate 23 in General Report.)

This was a typical case of the Texas disease, and revealed a large mass of cellular tissue around the rectum, and in which the kidneys were imbedded, which upon microscopic examination revealed an abundance of hæmatoïdine crystals.

October 17th. Three steers found sick; two of Bright and Fagan's, and one of Williams and Richardson's; removed to hospital.

Temperature Records as follows:

DATE.	LOP HORN.—B. & F.			SPOTTED.—B. & F.			ORUMPLE HORN. W. & R.		
	A. M.	M.	P. M.	A. M.	M.	P. M.	A. M.	M.	P. M.
Oct.									
17th	$101\frac{1}{4}^{\circ}$	101°	100°	101°	101°	102°	$104\frac{1}{4}^{\circ}$	$103\frac{1}{4}^{\circ}$	102°
18th	$100\frac{1}{4}$	101	100	101	$101\frac{1}{4}$	101	$104\frac{1}{4}$	$103\frac{1}{4}$	102
19th	100	$101\frac{1}{4}$	$100\frac{1}{4}$	101	$101\frac{1}{4}$	102	104	$103\frac{1}{4}$	$103\frac{1}{4}$
20th	100	released	.....	100	$101\frac{1}{4}$	.....	103	$100\frac{1}{4}$	released.
21st	.....	.....	.....	100	101	99	.....	.....	.....
22d	.....	.....	.....	100	101	100	.....	.....	.....
23d	.....	.....	.....	100	$99\frac{1}{4}$	98	.....	.....	.....
24th	.....	.....	.....	99	100	released	.....	.....	.....

On the morning of October 17th a fine fat bullock was abandoned near the National drove yards, and was carried to the rendering dock and slaughtered during the afternoon. The animal was slaughtered when in a moribund condition. Temperature of rectum, blood, and of the liver was one hundred and one and a half degrees; weight of liver, twenty-four pounds; gall bladder filled with thick flaky bile; weight of spleen, five and three-quarter pounds, disorganized; bladder filled with bloody urine; rectum contained a thick, black fluid, resembling black vomit; the fourth stomach was eroded and ulcerated; the kidneys were engorged to seventy-five per cent more than their natural size, and were beginning to be disorganized; lungs were healthy; no coagulated blood was found in the heart or great vessels.

From October 17th to 22d daily inspections of all cattle arriving were continued; no new cases found. 22d. Commissioner Gould having learned some facts with reference to a dairy herd that had become infected at Hamptonburgh, Orange county, desired me to go with him and prosecute an investigation into the circumstances.* We, therefore, proceeded to Newburgh, and were joined by Dr. R. V. K. Montfort, the Assistant Commissioner for Orange county. We then visited Goshen, and from thence went to Hamptonburgh, where the following facts were elicited:

On the 25th day of August, there arrived at Hamptonburgh, Orange county, N. Y., forty-four head of native cows and heifers directly from Painesville, Lake county, Ohio, on the line of the Lake Shore road, over

* Dr. Montfort, the health officer of Newburgh, who had been vigilantly watching the movement of suspected cattle arriving at that city from Albany, unexpectedly discovered that the Texas Cattle Disease had made its appearance on the southwestern margin of that county, near Hamptonburgh. The following is his first account of that outbreak:

"NEWBURGH, September 17th, 1868.

"E. HARRIS, M. D., *Metropolitan Board of Health*:

"Dear Doctor—Two car-loads of cattle (forty in number), said to be from Ohio, were purchased at Montgomery, in this county, on the 28th day of August, and were driven some five or six miles, to Hamptonburgh, the same morning, arriving about 9 or 10 o'clock. Soon after, one of the finest cows in the herd was taken sick, and died before night. Two of the herd were bought by William Moul, a neighboring farmer, and were left three or four days upon the farm of John Moul, grazing with his dairy cows. They were then removed. Ten days after their purchase one of these cows sickened and died in a few hours. Three days later the second cow also sickened and died in a few hours. Saturday, September 12th, one of the cows of John Moul was taken sick. She died on Sunday. Monday night another cow of John Moul sickened and died Tuesday afternoon. Both of these had grazed with the two left for a few days by William Moul. The remainder of John Moul's cattle are still healthy. Fifteen bullocks, out of two car-loads, are yet in the neighborhood, all well. Two were purchased by a Mr. Carroll; one is well, the other sick; appears very weak; pants heavily on the least exertion; gives milk, but in small quantities; feeds poorly; had a calf two weeks ago. The owner says she never *cleared*, and ascribes her illness to that cause. Eleven of the same load were sold to a farmer near Montgomery, and when last heard from were all well. I know nothing of the balance (9). Hamptonburgh is an old cattle stand, where a large part of the farmers of that portion of Orange county purchase their stock.

Yours truly,

R. V. K. MONTFORT."

"(Signed)

which Texas cattle frequently travel. They were purchased in Buffalo for Mr. Hodge, a cattle dealer at Goshen, Orange county, N. Y. On the morning of arrival one of the cows was observed to be unwell, and died in a few hours. The symptoms observed were as follows: "The head hanging low down, gait staggering; appeared very weak, and finally fell down, death supervening soon afterward." August 29th (four days after), two cows were purchased of the same lot by Wm. Moul, apparently well. They were driven about six miles, and were turned into the pasture among the dairy cows of Mr. John Moul. Here they remained from Saturday, the evening of the 29th, until Tuesday morning, the 1st of September (three nights and two days), when they were removed some miles distant. September 8th, one of these cows died. The other was then taken back to Hamptonburgh, the place of purchase, as under suspicion, and on the 10th of September also died. The symptoms of disease of this cow were recognized as the same as those that had been seen among cattle at Buffalo that had died with the "Texas fever," and were as follows: "Drooping of head and ears; staggering gait; eyes dull and staring; great debility; rough coat, and generally such appearances as are not observed in the ordinary diseases of cattle" with which they had been familiar for years. Upon tracing what had happened from the exposure of the dairy cows upon John Moul's farm, where these two cows had been pastured for a short time, we found that upon the 12th of September (thirteen days after exposure), one of the milch cows was found to be ailing. Her milk had been falling off in quantity for three or four days; she appeared uneasy, frequently lying down; very thirsty; would not feed; head drooping near the ground; standing braced with the hind legs; coat rough, dung natural, urine not noticed; no cough, and on the night of the 13th died. On the 14th (fifteen days after exposure), another cow was observed to be sick, presenting symptoms the same as the former, with the addition that she seemed indifferent to passing objects, remaining alone by herself, and passed bloody discharges from the bowels, and dark, bloody urine; milk entirely suppressed, although she gave the usual quantity the night before. She had been suffering with hoof distemper three weeks previously, but had entirely recovered from it. She died on the 15th (the following day). The 18th September (nineteen days after exposure), the third cow was sick, and during that day was found dead in the pasture. Her milk had been diminishing in quantity three or four days previous to death, and she had presented much the same symptoms as those previously affected. These cows unfortunately were not examined after death, but were deeply buried.

The two cows that had died of the original herd were not buried sufficiently deep, as during the process of decomposition after death, the thin covering of earth was thrown off, leaving the carcass of one of them exposed. Two pairs of oxen and two young heifers were allowed to pasture in this field where the dead cows were buried, and one of the pairs of oxen was used in hauling the dead cow. About two weeks after, one of the oxen

was found to be sick, and presented the same symptoms before described, from which, however, he finally recovered. Another ox belonging to the second pair was found dead, on the 21st of September, in the field, being twenty-eight days from the burial of the first cow.

October 24th. The two heifers, one a yearling, the other two years old, which had been pasturing in the same field where lay the dead cows, and where the oxen were sick also, were found dead. They had not been discovered to be suffering with any illness. A post-mortem examination of these revealed the livers enlarged; spleens enlarged more than twice their natural size, engorged with blood, in a state of decomposition; kidneys engorged with blood, softened almost to decomposition; bladders containing a very small quantity of urine of a healthy consistence. All the other organs were found in a healthy condition, except the abomasums, or fourth stomachs, which presented several superficial ulcers upon the thick or pyloric extremity, as well as some lines of ulceration among the folds of the thinner portions. The carcasses, after examination, were thoroughly burned up.

From these investigations, which were carefully and thoroughly made by the State Commissioner, J. Stanton Gould, and Assistant State Commissioners, Drs. R. V. K. Montfort and Moreau Morris, there can be no doubt that the drove originally from Painesville, Ohio, had been infected with the malignant poison, either before starting or during their journey, and that they had communicated the disease to the dairy cows and oxen at Hamptonburgh. These dairy cows had not been off from the farm of Mr. John Moul for the past two years, and had not been exposed to any strange cattle at any other time. The oxen had been in the town and county for several years, and had not been exposed in any other manner. That these cattle had the "Texas fever," all the testimony of persons who had observed them, and by one who was familiar with the symptoms, having frequently seen cattle suffering with the disease at Buffalo, must convince any candid mind. The remarks of several persons (old dealers in cattle) that these sick ones did not appear to have any disease with which they had been familiar, afforded another proof that this was an importation of some new and malignant disease among them. Two more milch cows died, one on the 26th and the other on the 28th October.

The subjoined letter from Dr. Montfort, gives the history of these cases:

NEWBURGH, *November 9th*, 1868.

MOREAU MORRIS, M. D.:

Dear Doctor—We have had two new cases of Texas fever since I saw you. The first case after you were here occurred on Monday, the 26th of October. She was observed to be sick on Monday, with the usual premonitory symptoms, although they were so slight as readily to escape the observation of a casual observer. She gave a fair quantity of milk at night. She died about 7½ A. M., Tuesday. A post-mortem made about eight hours after death gave the following results: Flesh very dark; fat of reddish yellow color; lungs perfectly healthy;

heart healthy; spleen enlarged to three times its natural size, engorged with blood and disorganized; liver slightly enlarged and fatty; gall bladder very full, contents but little changed; kidneys natural; fourth stomach reddened and inflamed, particularly at pyloric extremity, with ulcers; mucous coat softened, peeling off readily; bladder entirely empty and contracted, feeling almost like a ball; rectum very much inflamed; mucous membrane softened. The period of incubation could not have been less than thirty-five days. Another cow died on Wednesday night, October 28th. She was first seen to be sick in the morning. Nothing particular was observed, excepting the arching of the back, and great restlessness. No post-mortem.

(Signed)

Yours truly,

R. V. K. MONTFORT.

REMARKS UPON THE CASES IN ORANGE COUNTY.

This remarkable group of cases in Orange county justly awakened a profound interest, and induced the most searching inquiries connected with the history and exposure of the herd in which these deaths occurred. The exceptional characteristics presented by the sickness in those herds, called for the most exact diagnosis of the nature of the disease. First—Cattle that were supposed to be natives of the Western States, and that had arrived from Painesville, Ohio, in the ordinary course of traffic and transportation, began to show symptoms of disease within a week from the time of their shipment from Painesville, Ohio. The true Texas Cattle Disease, as has been shown in Dr. Harris' correspondence, was at the time prevailing in Summit county, Ohio. That these cattle, which were at least reputed to be native stock, and communicated the disease to the healthy herds of the district with which they were pastured in common, did communicate the same kind of fatal disease that killed several of their own number, does not admit of the shadow of a doubt. In the absence of those exact methods of investigation which the medical anatomists pursued in our cities, we do not hesitate to take the straightforward testimony of experienced herdmen, who saw the disease and described it to us.

In the two post-mortem examinations which Health Officer Dr. Montfort and I made at Hamptonburgh, in the month of October, we were able to recognize the disease by the usual post-mortem evidences, and better still, by the particularity and completeness with which the entire history of events and symptoms of these cattle were related to us. Here was the history of eight fatal cases of the Texas Cattle Disease in three different herds, in which no ground of doubt existed, that exposure to the Western cattle constituted the starting point and source of the disease; and viewing these eight cases purely upon medical evidence alone, we might safely conclude, reasoning by exclusion, that the Western cattle brought the disease into these herds.

The points we would notice specially in these cases occurring in Orange county, are:

1st. The evidence concerning the period of incubation, gives an interval from fourteen to twenty-eight days.

2d. From careless and imperfect burial of dead diseased cows, the infection was communicated to other healthy native stock; and

3d. That the evidence of the contagion of the Texas Cattle Disease being communicated from native to other native cattle in this group, is beyond a doubt.

THE INVESTIGATION INTO THE HYGIENIC CONDITION OF BEEF CATTLE OFFERED TO THE METROPOLITAN MARKETS, AS FOUND IN THE SLAUGHTER-HOUSES AT A PARTICULAR TIME.

Numerous facts having come to the knowledge of the Board of Health, concerning diseased meat being offered for sale in the public markets, a simultaneous inspection at a large number of slaughter-houses during the slaughter of cattle, for a limited period, was deemed necessary.

On the 15th day of September, the following order was issued to eleven sanitary and assistant sanitary inspectors of the Board:

[Copy.]

METROPOLITAN BOARD OF HEALTH,
NEW YORK, September 15th, 1868. }

TO DR. MOREAU MORRIS, *Sanitary Inspector M. B. H.*:

Sir—I have called upon the acting Superintendent of the Metropolitan Board of Health, Dr. Horatio Paine, to call together a force of inspectors, twelve in number, viz: Strang, Howard, Wadsworth, Demainville, Randall, W. V. White, Lee, Janes, Thayer, Fisk and Colton, and Deputy Registrar Stiles, to meet at this office at 11 o'clock to-morrow, September 16th, for special duty of inspection, subject to your special direction, upon the matter of diseased cattle and diseased meat in our midst. You will proceed with this inspection at once, and report.

Yours very respectfully,

(Signed)

GEO. B. LINCOLN,
President Metropolitan Board of Health.

The following named gentlemen were thus detailed: Inspectors Drs. Janes and Lee, of New York; Drs. Fisk, Thayer and Colton, of Brooklyn; Assistant Inspectors Drs. Howard, Strang, White, Wadsworth, Demainville and Randall, of New York; and were directed under specific instructions and uniform methods, to make examinations at the different butcheries in their respective districts. All proceeded at once to the dock of the New York Rendering Company, foot of Thirty-eighth street, North River, where an animal sick with the Texas Cattle Disease was slaughtered in their presence, and carefully dissected. Illustrations of the specific lesions of the disease, which had been made from previous dissections of slaughtered animals, were also exhibited to them, with explanations, so that their examinations could be made understandingly.

The investigation was continued for three days consecutively, with the following results:

Two hundred and ninety cattle were slaughtered in their presence, and of these, two hundred and thirty-six presented evidences of diseased condi-

tions. The viscera of many others which had been slaughtered upon the same days, but at whose slaughter they were not present, were also examined carefully, and found to present evidences of the same conditions. With two exceptions, all reported finding abundant evidences of different conditions of gastric disease, while but two were able to identify the lesions found as belonging to the Texas Cattle Disease. (See plate 3.) These were observed by Dr. E. H. Janes and B. Howard, in a lot of ninety-four Texan cattle that had recently arrived from the West, and were among those that had introduced the disease among native cattle in Illinois, and had not been wintered during one season at the North. Dr. Janes reports: "From the foregoing facts, a thorough examination of their internal organs became a subject of more than ordinary interest. The abomasums, without exception, revealed evidences of having been extensively diseased, as shown by numerous cicatrices and erosions in the process of healing, as well as a general hyperæmic condition of the mucous membrane, showing that the animal was suffering, to a greater or less extent, with chronic gastritis at the time of slaughter. The spleen was invariably enlarged to at least twice the size of those from healthy Northern stock, as was found by testing the weight of each. Photographic views illustrating the comparative size of the spleen of the Texan with that of the Northern stock, have been prepared." (See wood cuts in general report.)

Dr. Howard being present also at the slaughter of a portion of this herd, remarks that "the lesions observed in these Texas cattle were the same as those we had found in those of our native herds affected with this disease, and that as nearly as possible the disease in each case is identically the same." Having been present myself during the slaughtering of a portion of this herd, I can fully corroborate the truth of the foregoing statement.

As a result of these investigations, the following conclusions are unavoidable:

That our Metropolitan markets are supplied with large quantities of unwholesome beef, the cause of which is wholly preventable.

That cupidity and self-interest, among a large class of dealers, will regard neither health nor life in the pursuit of gain; consequently it is the imperative duty of legislators and health authorities to authorize such sanitary regulations and restrictions as shall at all times guard and protect the public health.

Skilled inspection, and regulation in the transportation of our animal food supply from the great producing sources to the final slaughter, with proper authority to compel compliance, would be, and is, the only safeguard necessary to secure a healthful animal food. Our State and the Metropolitan District being the great consumers, must place such restrictions as will secure this end.

OBSERVATIONS UPON POST-MORTEM EXAMINATIONS OF DISEASED TEXAS CATTLE SLAUGHTERED AT BUFFALO, N. Y., LAFAYETTE, IND., AND SPRINGFIELD, ILL., AT WHICH WERE PRESENT COMMISSIONERS PATRICK AND GOULD, AND ASSISTANT COMMISSIONERS MACKAY AND MORRIS.

At Buffalo, on the 24th November, 1866, we found in the cattle yards of the New York Central Railroad two Texan steers; arrived on the 23d inst., directly from Abilene, Kansas; owned by George Toffey; sick with the Texas Cattle Disease, and evidently in its last stages, presenting the following obvious symptoms:

No. 1. A dun-colored, four year old steer, standing with head low down; saliva running from the mouth; ears drooping; eyes staring, glassy and dull; coat rough; arched spine; hind feet drawn under the body; voiding bloody urine; feces fluid and dark; gait staggering; subsultus tendinum of portion of flank muscles; great debility; unable to walk any distance without falling down; rising with great difficulty; temperature of rectum, $105\frac{1}{2}^{\circ}$ Fah.

Pathological Appearances at Slaughter, 1 P. M., Same Day.

Temperature of blood flowing from carotida, $106\frac{1}{2}^{\circ}$ Fah.

Liver enlarged, much congested, fatty degeneration, and weight 17 pounds 8 ounces.

Spleen enlarged; engorged with dark blood; a pulpy mass; size, 2 feet 5 inches long, 6 $\frac{1}{2}$ inches wide, and at the thickest part 3 $\frac{1}{2}$ inches through; weight, 5 pounds 13 ounces.

Omasum or manifold stomach, the maniples impacted with firm, dried, partially digested food, resembling gun wads in form. The epithelial coat peeled off whenever the food was removed, and was easily detached by the finger.

Abomasum (4th or rennet stomach) presented deep excavated ulcers through to the muscular coat, particularly in the pyloric portion. The larger folds of this stomach very slightly inflamed, and having small longitudinal ulcerations along the margins of the folds, filled with coagulated blood.

Bladder distended, with about a quart of dark, bloody-colored urine. The mucous coat of its neck very oedematous; that of the fundus thickened and covered with fine red puncta.

Kidneys enlarged, much congested with blood; mottled, of a very dark brownish color; softened.

Rectum: longitudinal folds highly injected and inflamed; eight in number.

Cæcum deeply injected at its extremity.

Ileum: large red points arranged in longitudinal lines; epithelial coat softened and easily removed by the nail.

Brain somewhat softened in its cortical substance.

Bile thick, tarry, somewhat flaky, though less so than in many cases previously observed.

No. 2. Was of a dun brown color; Texan; aged about five years.

External or Obvious Symptoms.

Head hanging down; ears drooping; eyes dull; conjunctiva jaundiced; listless; gait staggering, feeble; flanks very much tucked in; urine clear; feces thin, dark fluid; pulse 120 per minute, soft and easily compressed; temperature $104\frac{1}{2}^{\circ}$ Fah.

Slaughtered at 2 p. m. same day: temperature of blood, 105.1°; temperature of liver, 15 minutes after death, 104.4°—fatty, larger size than average normal—not weighed.

Spleen enlarged and engorged with dark blood; pulpy mass; weighed 3 pounds 15 ounces.

Brain: superficial vessels much congested; cortical tissue softened.

Bladder: small quantity of urine of healthy appearance.

Abomasum, or fourth stomach, presented over its pyloric surface several cicatrices in different stages of reparation, and one large, deep-excavated ulcer with edges everted; size of ulcer, 2 inches long, 1 inch wide, and $\frac{1}{4}$ inch deep, surrounded with dense, hardened tissue; some marks of gastritis, consisting of erosions of the thin mucous coat of the large folds along their free margins.

Onasum, or maniple stomach, appeared healthy. The intestines appeared in a healthy, normal condition, except rectum, which was somewhat congested.

Kidneys normal.

Specimens of the blood, bile and tissues of the animals were secured, and a portion of each forwarded to Dr. Stiles, of Brooklyn, for microscopical examination. He reported, a few days after, that these specimens presented indubitable evidences of the Texas Cattle Disease. The same evidences were observed by an examination under the microscope of Prof. Hadley, of the Buffalo Medical College, on the day of slaughter.

At Lafayette, on the 27th November, we examined the stomachs and viscera of over twenty Texas animals of a herd of eleven hundred that had not been wintered over, but arrived in Indiana early in Spring. These animals were said to have communicated the disease to various other herds of native stock during the past summer, and two hundred and forty of them were now being slaughtered for packing at the establishment of Sample & Sons, at Lafayette, Indiana.

The stomachs, livers and spleens afforded, in every instance examined, evidences of former disease.

At Springfield, on December 1st, two healthy animals were examined at slaughter, one a Texas steer, the other a native heifer. The Texas steer presented cicatrices of former ulcerations in the pyloric portion of the fourth stomach, although all other internal organs were perfectly healthy, while the fourth stomach and all other viscera of the heifer were in a sound and healthy condition.

EVILS THAT HAVE BEEN RESTRAINED AND CONTROLLED, AND SANITARY MEASURES CONCERNING CATTLE AND BEEF IN THE CITIES OF NEW YORK AND BROOKLYN.

Observation has revealed the fact that large quantities of unwholesome beef and other meats are constantly thrown upon the supply markets for consumption, so prepared and disguised that detection is almost impossible. Unscrupulous dealers, having no fear of authority to control them, unhesitatingly sell whatever can be obtained, regardless of life and health. The laboring classes, those who really need the most wholesome and nutri-

tious of meats, are, therefore, the greatest sufferers, for, by reason of low prices, they are induced to purchase inferior qualities. Hence the imperative necessity for sanitary regulations and control, that all danger of diseased and unwholesome meat consumption must and shall be avoided.

The results of the control and regulation of meat supply, as carried out during the past few months, are that a better quality, at reduced prices, was secured; thus protecting the lives and health of all, and establishing the necessity for a continued and systematic inspection, not only at the great sale yards, but also at the butcheries.

The alarm of the public by rumors of diseased meat being offered in the markets, and the fact of being unable to discriminate between wholesome and unhealthy meats, caused the consumption and sale of beef to be very largely diminished. Supplies of market cattle at the herd yards were seriously threatened, until the prompt and efficient measures adopted by the Board of Health and State Commissioners, in the sanitary control and inspection of all herds arriving at our herd yards, reassured the public, and at once established confidence, both in its sale and consumption. The danger to life and health by its consumption was great, and, on the other hand, the deprivation of good animal food was not without evil; therefore, to secure both was a paramount duty of the Board. The sanitary regulations established by the control, inspection, seizure and destruction of diseased animals and beef was therefore at once determined upon and effected; all beef cattle arriving within the Metropolitan District were subjected to a critical inspection as regards their physical condition; if any were found either sick or under suspicion of being infected with disease, they were at once seized, and either slaughtered and sent to the rendering tanks, or held under observation until all danger from diseased conditions had passed. These regulations secured effectually the public health, and prevented, in a very large degree, the forwarding of diseased animals to the herd yards. The supply became of a better quality and at lower rates. Increased watchfulness on the part of the sanitary police at the slaughter-houses and retail stands, prevented the sale not only of unhealthy beef, but also of large quantities of other unwholesome meats.

WHAT IS DESIGNED AND WHAT SHOULD BE ACCOMPLISHED BY SANITARY INSPECTION AND CONTROL, AS REGARDS ANIMALS AND MEAT IN THE CITIES OF THE METROPOLITAN DISTRICT.

When cattle dying of this new disease were found in the herd-trains and market yards that supply the metropolis, the fact at once was painfully obvious that no regulations or officers then existing could discover and prevent the sale of any or all of the flesh of those dying and dead animals in the meat markets of New York and Brooklyn.

(1.) As regards the sales yards and butcheries, there existed no system of inspection and no means of control with reference to the prevention of the selling and slaughtering of diseased animals.

(2.) There was a lack of any adequate means for officially inspecting and sanctioning meats after they are dressed for the market.

(3.) Except in connection with the statutes against rinderpest, there was nothing worth the name against any kind of exposure of diseased animals, and against all sorts of cruelties and abuses in their transportation, yarding and sanitary care.

Expert and careful inspection at herd and sale yards, of all animals used for human food, is absolutely required at all times, as some form of disease exists at every season of the year in the various kinds of animals so used. Authorized sanitary control and regulation should be permanently established, and carefully and efficiently executed, not only as regards the herd yards and butcheries, but State authority, with power to enforce regulations, should control and so regulate the transportation of animals as to present them to the markets in the most healthy condition.

WHAT CONCLUSIONS AND RESULTS HAVE BEEN REACHED.

The conclusions deduced from the experience of the past summer indicate the necessity for

First. Regulation and police control under a uniform law, applicable to all the States through which pass the great transportation routes for market cattle, in order that the first evidences of any contagious disease may be arrested.

Second. Such control to have sufficient State authority to compel transporting agents, owners or their aids, to take proper care of their stock in regard to rest, feeding and watering at stated regular intervals of time during transportation, and up to the time of slaughter.

Third. Skilled medical inspection at stated points; all diseased animals to be at once slaughtered or held under observation until all danger is passed. This inspection to be continued during the whole year.

Fourth. All animals at the slaughter-houses to be critically examined at the time of slaughter, and the beef to be so marked that any consumer may be assured of its having been properly inspected.

Fifth. Such authority to be given that all diseased meat may be seized and disposed of in such manner as to prevent its being eaten. The results of such control and inspection will be the public assurance that danger to health and life from this source will be reduced to the least possible degree, that fraud and deceit will be under control, and that the aim and efforts of enlightened sanitary laws shall be supported and enforced.

CONCERNING SYMPTOMS AND SIGNS OF DISEASE.

Diagnosis.

In studying the history of this disease, the following points present themselves by which professional and non-professional observers can be guided in pronouncing the diagnosis:

1st. The symptoms by which the disease is characterized in the the infected cattle while living; and

2d. The signs by which it is recognized in them when dead, or at their slaughter.

1st. Animals suffering with this disease present the following obvious symptoms. (See plate No. 1.) * Generally standing apart from their fellows, listless, indifferent to surrounding objects, restless; evidently desiring to lay down but fearing to do so, until compelled to yield by rapidly waning strength; the head hanging low down, frequently within an inch of the ground, or occasionally pressed firmly against some unyielding object; the base of horns hot, the ears drooping, the eyes dull and staring; the spine, or back, peculiarly arched, the hinder feet being drawn under the body and placed in a bracing attitude; a tremulous creeping over the flank muscles, with frequent efforts at voiding feces, which are generally small, hard and rounded, and covered with bloody mucus, though there is sometimes considerable looseness of the bowels, during some stages of the disease; frequently passing urine of a dark, bloody appearance. The pulse is rapid, very soft and feeble, respirations frequent, and during hot weather, panting, without exertion. The temperature both externally and internally increased. Flies are also observed to adhere to the animals, who seem either unconscious of their presence or too feeble to drive them off.

2d. The signs or pathological appearances presented upon post-mortem examinations.

When animals dead of this disease are examined, even three or four hours after death has naturally taken place, it is found that there has been such rapid decomposition that the special pathognomonic signs have become almost entirely obliterated, so rapidly does the peculiar activity of this poison destroy vital tissues. It is only in the previous history of symptoms, in connection with certain marks of destruction upon the dense, firm membrane lining the tubular and pyloric portion of the abomasum, or fourth stomach or "reed," as it is called in common parlance, that a positive diagnosis can be given.

But the signs, as presented upon an examination at slaughter are so uncomplicated with post-mortem changes, that the disease is pronounced unequivocally throughout the fluids and tissues.

1. A greatly increased temperature of the body and the blood is an indubitable and most trustworthy symptom of this disease, for it is the first symptom discoverable; it is excessive and extraordinary in degree, and it marks this disease as a pestilential fever.

2. Upon opening the animal the muscular tissue is seen of a dark red

* Dr. Harris has kindly directed that the lithographed plates which he caused to be prepared for the General Report, shall be distributed in the several sections which require illustration.

color; the fat is of a deep brown yellow, having in intense cases a green bronzed tinge. (See plate No. 2.)

3. The spleen is found enlarged, more or less engorged with dark colored blood, softened, frequently to a pulpy mass.

4. The abomasum, or fourth stomach, upon its inner tubular pyloric portion invariably presents sloughs, erosions and deep excavated ulcers of various forms and extent. (See plate .) There is usually accompanying these, more or less inflammatory appearances of the larger and more vascular portion of this stomach (gastritis). The ulcerations, or rather the peculiarities, that were found in the tubular portion of the rennet or fourth stomach, at the base of the longitudinal folds in that stomach, finally appeared to be a surer guide to recognition of the disease than was the mere appearance and size of the spleen or the liver; the absolute tests by the minute examination of the liver, bile and spleen-pulp by the microscopist, and the historical and symptomatic history of the animal before death, being of course preferred to all other kinds of evidence. Yet to the practiced eye, these ulcerations, sloughs and erosions served as trustworthy guides in deciding the nature of any case in which, for the moment, the other kinds of evidence were not accessible.

5. Kidneys generally enlarged, darker in color than normal, congested with blood, and the cortical substance usually softened.

6. The liver enlarged, increased in weight, generally fatty or waxy, its bile ducts and radicals fully injected with bile, its color changed to a yellowish brown.

7. The gall bladder filled with a dark, thick, tarry or flaky bile.

8. The bladder distended with dark, bloody urine.

9. The intestinal canal in its various portions, the ileum, caecum and rectum, frequently presenting congested vessels under its mucous coat, its epithelium softened and easily scraped off with the finger.

10. The heart: muscular tissue sometimes found softened.

11. The lungs generally in a healthy condition; in some intense cases, interlobular emphysema.

12. The brain, in some cases, congested and softened.

In pronouncing the diagnosis of this disease beyond all dispute, the revelations of the microscope place the final seal upon all this group of symptoms and pathological changes.

The blood, and bile, and liver, under this (microscopic) test, give us a view of that factor which is the poison, which has produced these changes and death.

MOREAU MORRIS, M. D.



along the last part of the long lower portion being the lowermost and most fragile. (The plate No. 2.)

4. The upper part of the lowermost portion being the lowermost and most fragile. (The plate No. 2.)

5. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

6. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

7. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

8. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

9. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

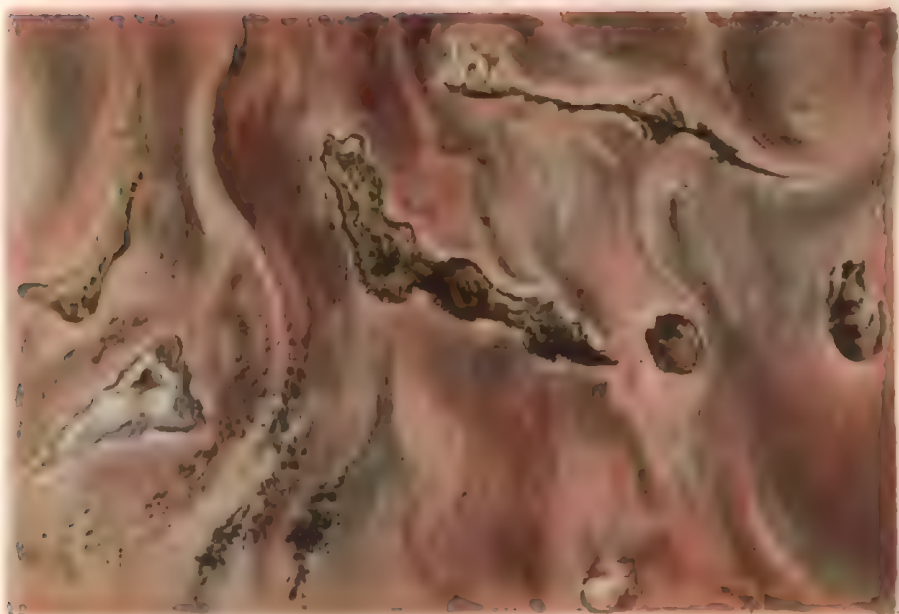
10. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

11. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

12. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

13. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

14. The lowermost portion being the lowermost and most fragile. (The plate No. 2.)

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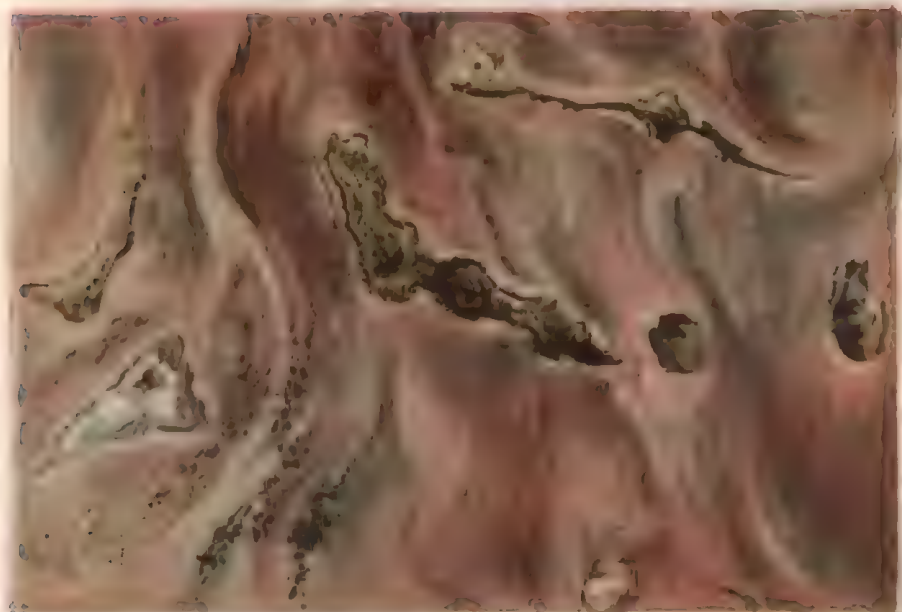


Fig. 1. The face of a patient with a large, deep, ulcerated chancre on the lower lip, and a smaller one on the chin. The skin is covered with numerous small, dark, pitted lesions, characteristic of syphilis.

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Fig 1



Fig 2



Mucous membrane of 4th Stomach

APERTURE OF DUODENUM

FIGURE 1. STOMACH AND DUODENUM. (See page 100.)



Plate 8
Microscopic view of bladder

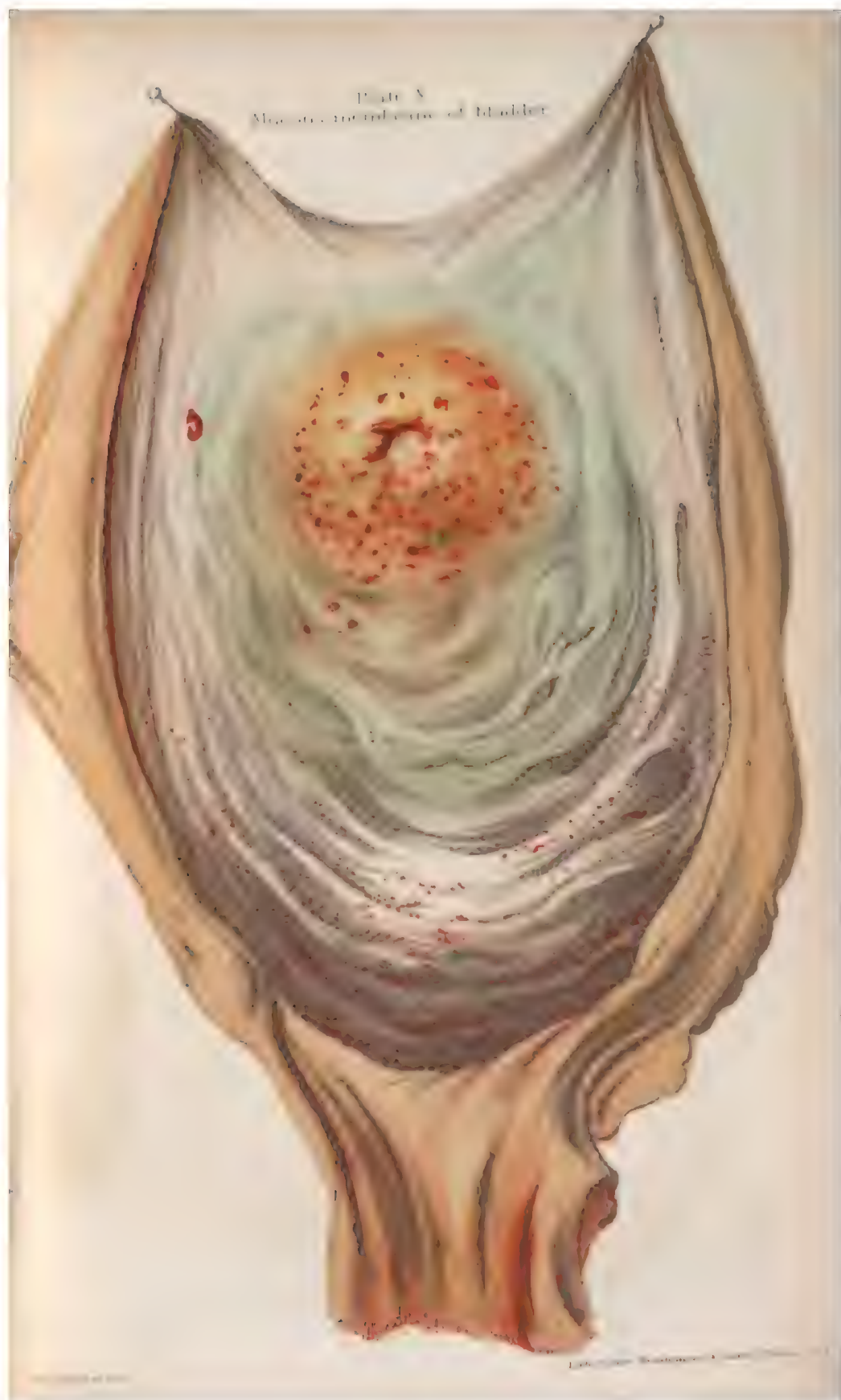




FIGURE 1. The two specimens.





Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The number of transformed cells was determined by the number of colonies obtained on the selective medium. The results are the mean of three independent experiments. Error bars represent the standard deviation.







III. OBJECTS ATTAINED BY CORRESPONDENCE WITH OTHER OBSERVERS OF THE DISEASE.

The correspondence upon this subject was opened on the 10th of August, and upwards of one hundred letters of inquiry during the ensuing two weeks were dispatched to those gentlemen along the great routes of cattle transportation, from Kansas City and Cairo to Toledo, Pittsburg, Buffalo and Providence. From that period to December 1st the correspondence has been maintained to such an extent as seemed essential to the end in view.

We sought for precise and circumstantial records concerning the arrival of cattle at any period sick and dying with the disease; secondly, circumstantial accounts of each outbreak of its infection in native herds; thirdly, dates which would establish in each case the length of the period of incubation of the infection in herds which became its victim; fourthly, descriptions of the phenomena and the results of the disease; fifthly, to trace the disease back to sources whence it came.

As neither the limits nor the objects of this report permit the introduction of our correspondence in bulk, we will here present such extracts from it as seem best adapted to throw light upon the history and progress of the infection.

Under date of August 10th, Dr. Edwin M. Snow, the Superintendent of Health in Providence, Rhode Island, communicated the following facts:

On Tuesday last (August 4th) thirty-three head of Illinois cattle were purchased in Albany by Messrs. Moore & Perkins, of this city. These steers were sent by railroad, and arrived at Providence at three p. m. on Wednesday, the 5th. They were driven to a pasture, and were supposed to be entirely well. On Friday one of the animals was found to be sick, and was killed, and on Saturday and Sunday (August 8th and 9th) six died in the pasture. All the animals that have died have been boiled up for their fat. All these cattle were raised in the State of Illinois. There were no Texas cattle in this lot.

Two days subsequently (August 13th) Dr. Snow writes:

The owners have voluntarily given them into my control, to do what I please with them. Eight of the ten now living were very low with the disease, but an astonishingly rapid change has taken place, and it now looks as if they would recover.

Under date of August 14th, Dr. J. H. Rauch, the Sanitary Superintendent of Chicago, began to forward to us daily accounts of the progress of the disease at the herd yards of that city. On the 17th of August he wrote as follows:

We have had the disease in our Fifth ward since August 1st, and for the last two weeks Dr. Manheimer, one of the Sanitary inspectors, has been making observations upon it. . . . I have disinfected the yards where the Texas cattle have

been. In Dr. Manheimer's inspection district (Fifth ward) sixty-two cows have died, and I have learned of several new cases this morning.

On the 16th of August, Dr. J. T. Hodgen, President of the Board of Health, in St. Louis, wrote as follows:

* * * The day before your letter was received, our Health Officer called the attention of the Board to the fact that a very malignant disease was prevailing amongst native cattle brought to our city. The disease has manifested itself at but one stock yard, and that at which most Texas and Cherokee cattle have been received, and in pens in which these southern cattle had been kept.

Yesterday a post-mortem was made of one that had died of the Texas disease. The Health Officer found the liver engorged, also lungs; the spleen enlarged and softened, and the kidneys disorganized masses, not showing a trace of original structure. The symptom was an uneasiness for a few days; this increased to almost a fury, the animal moving rapidly for a short distance and then standing, then a tremor and marked debility; it finally fell, and in a few hours expired.

Other examinations are being made to-day, and will be continued until we are satisfied of the pathology of the disease.

We have ordered the use of carbolic acid in pens in which Texas and Cherokee cattle have been kept, and have appointed inspectors of all cattle. We shall allow none to be killed without the inspector's brand and certificate.

Under date of August 19th, Dr. E. E. Mackey, the Health Officer of Buffalo, wrote:

My Dear Doctor—I fully concur with you in the expression of your fears that the many important and much desired facts pertaining to the cattle plague, now raging, will never be studied out to our satisfaction and enlightenment.

On the 10th of August, there were received at our yards fifty head of Illinois cattle, thirteen of which showed unmistakable symptoms of infection, and these symptoms were striking and peculiar in their nature. The animals appear to be very dejected, head drooping, eyes watery and wild in their expression, pulse very frequent and full, respiration increased in frequency, and the breathing labored. The secretions from the mouth and nose, in three of the cases, were of green, frothy or slimy appearance. The unsteady gait of the animals is mostly confined to the hind extremities, arising from, what appears to me, paralysis, or partial paralysis of the muscles and a deficiency in the power of co-ordination; indeed, so marked was this symptom, in three cases, as to preclude the possibility of the animal's rising. The temperature increased, and emaciation very marked. I can not say how long they would have lived, as I deemed it safer to have them immediately slaughtered. Post-mortem examinations showed the respiratory organs and the heart to be healthy, no structural change having taken place. The gastro-intestinal canal very much inflamed, and found to be, in many places, softened. The liver normal, the spleen very much enlarged, softer and more easily broken down than in health.

The urine coagulated on the addition of nitric acid, or on the application of heat. It may be of interest for you to know that so far the disease, as it has made its appearance here, has been confined to Illinois cattle, *not one* Texan animal, out of the large number that has been received here, has shown any discoverable or obvious symptoms of infection. In answer to your several points, I will say, first, that all my endeavors to obtain any reliable information beyond the mere fact of

these cattle being of an Illinois stock, have proved fruitless, and I am, therefore, without any data by which to judge; second, of the cattle in quarantine, four showed obvious symptoms of being diseased two days after their arrival, and on the third day showed unmistakable signs of the presence of hamaturia; three others that have since been attacked with the disease were immediately killed, and no observation was made upon the state of the urine and the bladder; third, out of the seven head killed while in quarantine, four were discovered to be infected two days, and the other three, four days previous to any obvious symptoms showing themselves; fourth, two dogs were fed upon the diseased flesh, and no other effect noticed than the ejection of the same shortly afterwards; in neither case would their stomachs retain or digest it. I am of the opinion, from the testimony I have been able to collect, and the little experience I have had with this infection, that there would be much danger incurred from eating the flesh and drinking the milk from these animals. It seems very improbable to me that so much gastrointestinal disease as I have seen in all these cases can be due to any other cause than the presence of some violent irritant. I will communicate further on this subject.

Respectfully,

E. E. MACKEY.

Dr. Rauch, the Sanitary Superintendent of Chicago, wrote on the 10th of August a full account of the procedures that were being taken by the Board of Health in that city. He inclosed the following account of Dr. Manheimer's investigations in the "infected district" (Fifth ward):

The increased mortality among the cows is found in a limited district of from two or three miles square, well defined on the south by Egan avenue and the stock yards; north, by Archer avenue; east, by Wallace street; and west-south, by the south branch of the Chicago river. Outside of these limits, until this time, no sickness or deaths have occurred. The region, then, where the disease makes its appearance, is the immediate vicinity of the cattle yards.

The first cases were noticed on Deering street, near Egan avenue, and from thence it extended, in a short time, to the above described limits; the largest number having died on Egan avenue, Douglas place, Main street and Hamburg, near the cattle yard, so that, from the 2d to the 15th of August, sixty-three cows and one steer died. The cause of the sudden spread of the disease is, so far, not yet satisfactorily explained by the investigations made.

It seems that native cattle do not communicate the disease to each other; as in many instances cows were housed in the same stable with sick cows, without being infected. With but few exceptions, all those cows became infected and died, that grazed near the cattle yards and in localities formerly occupied by Texan cattle, drinking of the same water used by the latter, and which may have become impregnated by their urine and excrements. (This water runs from the cattle yards to Egan avenue.) In a circuit of about two miles, only one cow escaped the disease, and that one was kept in the stable for the last three weeks.

All taken together tends to prove that the origin of the disease, or the cause of the same, is to be found in the Texan cattle that had been in the cattle yards and grazed in their immediate vicinity.

The symptoms of this disease, in the outset, are varied, as many of the cattle, from the beginning of the attack to the time of death, are quiet and in a lethargic state, evincing no signs of pain; while others are very uneasy, constantly moving about and lowing, until they drop down exhausted, where they remain until dead.

The following symptoms are noticed in all cases that have fallen under my observation:

In the beginning of the disease there is an uncertainty of step and trembling, showing an inability to remain firmly standing on the feet, and with a disinclination to move, the head drooping. The appetite does not seem to be impaired, nor is there any unusual thirst; the skin is alternately hot and cold; the secretion of milk is diminished, and about the fourth or fifth day a marked change in the appearance of the animal takes place. The abdominal walls are shrunken, the animals becoming lean, breathing quick and short, and do not have strength enough to raise themselves, and when raised cannot remain in that position for any length of time. The secretion of milk decreases daily, the secretion continuing until death, and is of a thick creamy character. The secretion of urine is also changed, the animal having a constant desire to urinate, succeeding, however, in ejecting only a small quantity of bloody urine. The faeces are discharged with great effort, and are dry and hard.

In this state the diseased animal lingers for a shorter or longer time, until it finally expires under appearances of exhaustion. The duration of the disease is from two to seven days.

Up to this time I have not been able to make as many post-mortem examinations as I desired, owing to the great anxiety of the owners to remove the carcass of the animal as soon as possible; and owing to the few dissections I have made, cannot as yet arrive at any satisfactory conclusions with regard to the character of the disease. The following is the result of post-mortem examinations made: An unusually early rigor mortis takes place (from one to two hours); abdomen much distended by gas; brain anæmic and soft; respiratory organs, found mucous membrane lining them, in anæmic state; in the trachea I found, upon opening, a quantity of mucus. Lungs pale, and at the base small hypostatic deposits; found no coagula in the heart, but from one to two ounces of thin blood, presenting an anomalous condition, as when the animal is for a long time dying, coagula are nearly always found. The muscles and valves of the heart were in a normal state. The stomachs filled with dry, solid, and half-digested food; want of secretion of the stomach; small intestines filled with bloody serum. The large intestine filled with a dry, solid, and half digested mass. The capillaries of the mucous membrane are injected, and small ecchymosed patches were found in the intestines. The annular veins of the muscular coat of the intestines engorged and enlarged. Spleen increased in length to twice its natural size; its peritoneal covering smooth, and stretched tightly over it; color darker than usual (a blackish brown); texture friable. The microscope revealed that the structure of the spleen had been totally destroyed, so that the normal elements of the spleen, viz., the corpora malpighii blood corpuscles, and its peculiar networks, were no longer to be distinguished. Liver slightly enlarged. The liver cells contain a small grained substance similar to the commencement of fatty degeneration. Gall bladder much enlarged and filled with light green, fatty-feeling gall. Bladder much enlarged (nearly twice its natural state) and filled with a large quantity of bloody urine. Blood very thin, and seems to contain less red corpuscles than usual.

This valuable and instructive record by Sanitary Inspector Manheimer, was accompanied by the following statement from Dr. Rauch: That he had that day examined a number of cattle at slaughter, which in the yards while living, did not present, to his eye, any positive symptoms of sickness, but after examining the spleen, liver, and contents of the bladder, he

found in many of them decided evidences of disease," and he further states: "I accordingly condemned the herds, so far as slaughter and sale is concerned, and shall allow no cattle to be sold as food unless inspected both before and after death." This important and judicious decision of Dr. Rauch was sustained by the Chicago Board of Health, and after consultation with Professor Gamgee, a plan for inspection was adopted which we shall mention elsewhere. In his letter of the 19th, Dr. Rauch informed us that the Chicago authorities had decided not to allow Texan or infected cattle to be brought into that city, and that such cattle, when found at Chicago, would not be allowed to be sent elsewhere. This action was fully in accordance with the desires of the Metropolitan Board of Health as regards the course which it was hoped the authorities of the State of Illinois, especially those of Chicago, would take.

In a communication received from Fort Wayne, Ind., and dated August 19th, the following was forwarded to the Metropolitan Board of Health for its information. The action referred to is dated August 10th.

Upon information that some forty head of cattle had arrived here in a sickly condition, so that they had to be killed, we find, upon investigation, that there arrived here about the above named number of cattle, in so bad a condition that they had to be killed, but that *they did not suffer from the so-called cattle disease*, and that the carcasses were delivered over to the soap factory, and none of their meat exposed for sale. At a special meeting of the Board of Health, held to-day, it was

Resolved, To notify Mr. Benton, the stock yard keeper, that the Board wishes to be informed if any more sick arrive, that they may personally inspect the same.

Resolved, Further, that it be the duty of the individual members of the Board to occasionally inspect the cattle yard during the hot season.

Dr. Rosenthal, the Secretary of the Board of Health at Fort Wayne, wrote to us on the 19th inst., and stated that the testimony upon which the above mentioned conclusions of their Board had been based, was "taken from persons who may not be able or willing to give the real facts, the carcasses having been removed before we could inspect them. You will see that in the future we shall be very strict, and inspect all cattle arriving here *that are reported sick*. We will also publish that part of your communication relating to the care and transportation of cattle, as well as the suggestions in regard to disinfectants."

The mayor of Pittsburg wrote as follows:

MAYOR'S OFFICE,
PITTSBURG, PA., August 22d, 1868. }

E. HARRIS, M. D., Cor. Sec'y M. B. H., New York:

Dear Sir—In answer to yours of the 18th inst., I would state that our cattle yards at East Liberty, and elsewhere in this neighborhood, are free from all infectious disease, and no further alarm here exists on this subject. Our cattle inspector, Mr. Hosack, is very vigilant, and has taken every precaution against the spread of the cattle disease here. I have advised him of the tenor of your letter, and he informs me that he had received a communication from you, which he will answer in detail as soon as possible.

• • • • •

Mr. Hosack, the inspector referred to by Mayor Blackmore, wrote as follows:

Sir—

The only cattle that were affected were the two droves from Illinois. I cannot inform you when or where the disease first showed itself. I discovered it on the arrival of the train. All the cattle on that train were more or less affected. After their arrival they were placed in the stock yards, near other cattle; in fact, I can say they were surrounded by other stock, but in no one instance did the disease show itself, save in the two herds above spoken of.

One of the two herds from Illinois (that arrived the first days of August, one of which was Mr. Alexander's, that you saw at Commungaw), forty-six died between Crestline, Ohio, and this city, and ninety-four died or were killed after their arrival.

There were two hundred and sixty-four in the two herds when they reached this city. The balance was shipped over the Pennsylvania Central Railroad as diseased cattle. The railroad company telegraphed to all points along the line of the railroad that they were *en route*. They were shipped on one train, no other cattle being allowed on that train.

Yours, respectfully,

(Signed)

WM. HOSACK,

Cattle Inspector.

[NOTE.—The second herd was switched off at Harrisburg, Pa., and sent southward.]

The subjoined extract from a letter received from the mayor of Altoona, Pa., the headquarters of the Superintendent of the Pennsylvania Central Railroad, correctly illustrates the same hearty cordiality that is shown by the letters just quoted. It was deemed important to have all needed sources of information on the great railway lines of transportation readily within our reach, and to know the truth by frankly asking such questions as we desired. It is now known that many thousand head of cattle from the infected districts were kept back from transportation at the time when it was perilous to move them, and that this silent action in New York prevented both losses and panic, by eliciting, as it did, the kind of inquiry and sanitary supervision which were then greatly needed:

To the Registrar Metropolitan Board of Health:

Dear Sir—Your communication, dated August 19th, came duly to hand, and upon its receipt I called a meeting of the city council, to give advice in the premises; and they, by unanimous vote, directed the mayor to reply.

Your communication relates to two points upon which you ask for information: First. The condition of native and Texas cattle which arrive here. In answer, we reply, that until the present time our cattle were entirely free from this infection, and we doubt not this will continue to be the case, from the fact that our city butchers are all men of character. They would not be guilty of so foul a crime as to slaughter diseased cattle and impose it upon the public for food. Second. Touching the course pursued by the Pennsylvania Central Railroad Company, in transporting beef cattle over their line of railroad, from Pittsburg to Philadelphia, it gives us pleasure to state that our meeting was honored with the presence and counsel of Edward H. Williams, M. D., the present efficient superintendent of the road; he assured us, and authorized us to assure you, that the company have

not, nor will they receive for transportation eastward, any beef cattle which have not undergone a strict examination by a commission of health officers, and also competent men of their own appointment, at their drove yards at Pittsburg; and for fear any taint of disease might break out on the way, they are re-examined again at Harrisburg, the capital of this State, by a similar commission. From that point, the Pennsylvania Central Railroad to Washington via Baltimore, and the New York road via Allentown, diverge from the Pennsylvania railroad, and if any diseased cattle are here found, they are disembarked and dealt with according to State and municipal laws.

Yours, respectfully,

(Signed)

GEORGE POTTS.

MAYOR'S OFFICE, ALTOONA CITY, PA., August 22d, 1868.

Town authorities likewise gave information of the existence and progress of the disease at various points in the West. The town of Onarga, Illinois, for example, sends the following :

There has not been a case of disease, to my knowledge (and I think I am posted), within sixteen miles of our place. At Loda, a railroad station about sixteen miles south from here, there was a load of Texas cattle unloaded from the cars and driven east across the country to Indiana, which, I believe, is the northern limit where the disease has been. The native cattle there, having communication with the Texan cattle, or herded upon their track or herding grounds, have become diseased, and it has been very fatal, sweeping off nearly whole herds. The cattle in pasture along the track have not been affected. One farmer who had his stock, a part in pasture and a part on herding grounds (open prairie)—those herded, many of them died; he then put the two herds together in pasture, and not a case occurred among those that had been pastured.

The manner in which the Texas cattle communicate the disease to the native cattle, is a question not yet settled; the facts are, that the native stock do not seem to give native stock the disease, but that Texas cattle do give the disease to native stock while in apparent health. And native cattle herding on the herding ground of the Texas cattle, or herding on land where the Texas cattle have been driven over, do take the disease, and it has been fatal in most cases.

The largest estimate of the number of cattle having died from this disease in this vicinity, is about eighteen hundred, and the disease has shown itself only where the Texas cattle have been.

The authorities have taken every precaution to stop the spread of disease. The diseased herds, and also the Texas cattle are confined to their present localities, and heavy fines and imprisonment have been imposed for bringing into or driving through the territory not already infected. The people are determined that the disease shall be confined to its present limits, and I think the disease has nearly spent itself, and as soon as we have frosts it will entirely disappear.

By the approval of the president of the board of trustees of the town of Onarga.

Respectfully yours,
(Signed) E. C. HALL,
Clerk Board of Trustees.

The following letter proves how intelligently the leading agriculturists in the west have communicated the results of their observations :

ODELL, ILL., September 11th, 1868.

E. HARRIS, M. D.:

Dear Sir—I had the honor to receive your communication a few days ago. It is certainly gratifying to know that science has been called in to assist in solving the problem presented by the appearance of the plague; and although I make no pretensions to scientific ability, yet I may possibly assist you by giving, in answer to your questions, the results of my experience and observation.

In answer to your first question, as to whether I have seen anything which would warrant me in believing that native cattle have propagated the cause of this disease, I would say that I have not. During fifteen years' experience in stock raising, I have never, until this summer, witnessed any malady bearing the slightest resemblance to the disease in question. In fact, I have never before seen any kind of infectious disease among Western stock.

2. I have seen no indication of this disease among cattle arrived this year from Texas, and though numbers of them die when brought here, yet, as far as my observation goes, I consider their death the result of fatigue, and the want of proper care.

3. No case of the kind has come to my knowledge.*

4. The general effect upon milch cows is the same as upon other stock. In most cases the flow of milk is almost instantly stopped. In two cases which came under my observation of "cows with calf," the disease culminated in abortion, which was followed by immediate convalescence of both animals. Allow me to add here, in reply to an inference drawn from questions four and five, that in proportion to the number of all kinds of stock exposed to infection, more milch cows and beef cattle died than of other kinds. May we not presume that animals, in which the secretions of fat or milk predominate, are more subject to attack than others?

5. Milch cows seem to be very susceptible. Calves are not so. Not in a single instance have I known of a calf dying of the disease. Stock of a year old and over, are not exempt from its ravages, neither does the breed make any difference.

6. The only evidence I have that cars may become infected is that every spot in this vicinity whereon Texas cattle have been, has teemed with death to our native stock. Permit me to use the common expression, "*I would not give a postage stamp for a car-load of cattle shipped from here to your city in a car, if a single Texas beef had been in the car for only one hour at any time from the first day of May until the first of November.*" So slight a contact is necessary to contract the disease that I have known cattle to die of it that had only been driven across a road along which Texas cattle had passed. Can any reason be given why cars may not become infected? Knowing what I do know of the nature of the disease, I do not hesitate to say that cars in which Texas cattle have been transported during the summer months are reeking with invisible death to our native cattle.

7. The length of time from exposure to attack varies from fifteen days to three months. My experience leads me to believe that hot weather will accelerate the progress of the disease, while cool weather will retard it; and an extended season of low temperature will effect a cure. The time from attack till death is from three to seven days, as near as can be ascertained.

8. To the best of my knowledge the first appearance of the disease in our county was on or about the 10th of August; and in the State about a month earlier. In

* Question 3, in my letter to Mr. Atkins, was: "Has any case of this disease occurred in Texas stock that has wintered over in your State?"—E. H.

our county the deaths number, as near as I can ascertain, ninety-eight; of the number in the State I cannot at present tell, though it must amount to thousands, for the scourge in our county has been light compared to what some of the neighboring counties have experienced. The number of recoveries, known to me, is ten, in our county. The proportion that sickened to the whole number exposed, has been as one to two and a half; or as two out of five.

9. In our county (I might say in our township, for it is the only place in the county where the disease appeared), we estimate the loss at about five thousand dollars; but I have no data from which to determine the loss in the State.

10. All that died were exposed to infection from Texas stock; so were all that are now living; which, with the exception of the ten mentioned in answer 8, escaped attack.

The route by which Texas cattle are brought into our State during the earlier part of the season was by Cairo, and thence they were shipped on the Illinois Central railroad to Chicago. Later, they entered the State at Alton, and were transported on the Chicago and St. Louis road to Chicago. Formerly, Missouri and Kansas suffered from the disease, occasioned by the introduction of those cattle. Within a year, however, mob law has kept them out of those States, and as there had to be an outlet for the stream of cattle from Texas, the tide was turned through Louisiana to the Mississippi, up which stream the animals were transported until they reached our borders, then turned inland to spread a contagion which has baffled the skill of the most experienced men.

In conclusion, I would say that I have *no reason* to believe that native cattle, even under circumstances the most favorable for infection, will infect other native cattle. Not one of the many I have seen die of this disease but that was exposed to infection from Texas stock; and not one of those in this vicinity, now living, but that was exposed to sick native cattle. I have seen a calf, which is now living, and in good health, that was suckled in succession by three different cows, which died of this disease in its most aggravated form. The little animal drew its food from them while they were sick, and when the first died it was given to another, and so on, and the process had no deleterious effect upon its health. It had never been exposed to infection from Texas cattle.

Hoping what I have written may be of some service to you in your endeavors to ascertain the nature and laws of this terrible disease, and to prevent further damage, I subscribe myself,

Respectfully yours,

FRED. A. ATKINS.

The subjoined note, from the pen of this very intelligent farmer, shows what very ample grounds he had for the opinions expressed in the foregoing letter. This note was published in *The New York Evening Post*:

ODELL, LIVINGSTON Co., ILL., }
August 31st, 1868. }

• • • • In the vicinity of my residence is a parcel of vacant prairie, containing about twelve hundred acres, which is used in common for pasturing stock by those farmers who live near by it. For several years past this has been the custom, and during the time there has not been the slightest indication of any epidemic disease; but, on the contrary, the cattle have been remarkably healthy, and the land has been peculiarly adapted to grazing, it being well supplied with water, and an abundance of nutritious grass.

On the 25th of June last, about four hundred head of Texas cattle were unloaded from the cars at Odell, and driven to the prairie above mentioned, and they were there herded until the 28th, when they were re-shipped for Chicago.

At the time those Texas cattle were here there were one hundred and forty-seven head of native cattle being herded upon the same ground. This number was divided into three herds. In one of these, containing twenty-seven head, the disease appeared on the 10th inst., and it did its work so rapidly, that in just two weeks from its first appearance twenty-four out of the twenty-seven were dead. Of nineteen head of blooded stock owned by the writer, only nine are now living, ten having died in one week. Such has been the rate of mortality among the remainder, that of the one hundred and forty-seven head above mentioned, sixty-six have died in three weeks; and, as near as can be ascertained, about one-fourth of the remainder are sick, beyond hope of recovery.

The figures I have given will serve to show the terrible malignity of the disease, and the certainty with which it accomplishes its work. Not only in this locality has the truth of my statements been manifested, but at Bloomington, below here, and Gardner, above, the result of the contagion has been the same. At both these places Texas cattle were unloaded from the trains; and at intermediate stations, where no disembarkation occurred, the native cattle are free from disease.

No better observations upon the cattle disease could be made than those by the intelligent gentleman whose letters we have just quoted. The experience of the intelligent agriculturists who, like Mr. Atkins, necessarily have had every incentive to seek for the true sources of the poisonous infection by which their herds were imperiled, and in some instances, swiftly destroyed, impelled them to ascertain the truth upon this subject.

The subjoined extracts from letters received from Dr. Thomas L. Neal, the efficient health officer of Dayton, Ohio, contain important testimony upon the subject of these inquiries. Under date of August 25th, he wrote:

Dear Doctor—I received your letter relating to cattle disease in due time. Up to that time we had no indications of trouble in our midst, but, there being a herd of Texas cattle left a few miles from us, in due time we were doomed to suffer the same penalty which seems to follow these same pestiferous “long horns.”

There are over a hundred Texas cattle grazing in a large field (over two hundred and seventy-five acres), where they have been since the last of June. Up to about 15th of August, no natives were infected; since that time eleven natives have died, and several others are sick.

Yours, very truly,

(Signed)

THOMAS L. NEAL.

In a subsequent letter he gives the history of this infection, as follows:

The farm on which it occurred is nine miles from the city. The first native to fall sick was a steer, three years old. This occurred on the 16th day of August, and precisely forty-seven days after any possible exposure to pasture or paths trodden by the Texas cattle. The owner of the Texas stock, in order to make a short cut, drove his Texans through the field where this steer then was grazing. This foreign stock was less than one and a half hours upon and passing over that field. In the field thus exposed, there were one bull, eight steers, six milch cows, four heifers and two yearlings (one a steer, and the other a heifer). Among those to sicken (and die, as all did), there were the yearling (steer), the yearling (heifer),

two steers (two and three years old), and five cows (three, four, two, six and seven years old), nine out of twenty-one. There were six other cows in the same field with the Texans, all of which died, save one, and by the way, the only one to sicken and not die, within five days. It has *not yet* fully recovered.

No instance occurred where a native contracted the disease which had not been exposed directly to the ground where the "long horns" had grazed. No ages or conditions (except the bull) seemed to possess immunity, as far as these observations extended. All of those dead were well-bred. The bull, however, was a thoroughbred Durham.

The first symptoms observed here were the drooping head and arched spine, and the tucked-up appearance of the flanks; the hair is lifeless; salivating, and from the first, with the cows, drying up of the milk. The droppings hard and dry, and covered with mucus, almost from the first, and a constant symptom, bloody urine. An early increase of animal heat; I did not take it, but there can be no doubt it was much above the normal standard. The gait was tottering, and a want of co-ordination occurred with all the cases I saw. Twitchings of the muscles, and a tremulous movement affecting the entire animal, but particularly the hinder parts. The animal "falls away" from the very commencement. As you ask for the "earliest symptoms," I shall not further particularize. There may have been some premonitory symptoms I failed to become possessed of, but from the first indications of illness observed, the duration of the disease was from three to five days. "The death-rate in total exposed," as nearly as I can ascertain, is about fifty per cent. As before stated, fifteen sickened and fourteen died. The post-mortem examinations were not made under my immediate supervision, and as they are not satisfactory to myself I will not trouble you with them.

Yours truly,

(Signed)

THOMAS L. NEAL.

From Cincinnati, Ohio, the last week in August, the following facts were received: On the 19th of that month the health officer received information that the cattle disease was prevailing in herds of cows near Cuminsville. A Mr. Hogan had pastured eight of his milch cows at Jones' wood, where a herd of sickly-looking Texas cattle had been pastured during the latter part of June. Mr. Hogan's cows began to pasture there some time in July. Seven of these eight cows died within three weeks after beginning to pasture there. A Mr. McCracken also pastured twenty-nine of his milch cows on the infected grounds near Jones' wood, and in about ten days from the time they commenced to feed there the sickness appeared, and in the course of a few days thereafter nearly all the cows had died.

An abstract from the official report of this outbreak near Cincinnati, by Dr. Clendenin, the Health Officer of that city, is here subjoined:

On the 3d of June the last herd of Texas cattle were brought to Cincinnati, over the Ohio and Cincinnati road, and were put into stock pens. They remained there over night only, and, on being inspected by our meat inspectors at that place, they were found to be very poor, and covered with ticks. They were ordered to be taken out of the pen and out of the city, as they were unfit for food, simply because they were so poor. They were taken to Jones' wood pasture, eight miles from the city,

where they were kept two days, and then brought back to the city. In the meantime there was a drenching rain, and the cattle were pretty well washed. They were put into pens at the Brighton stock yards, where they remained, perhaps, twenty-four hours, when they were removed for the second time to Jones' wood pasture, where they remained some three weeks, and were fattened up.

On one occasion some of those animals stampeded when going to water, and broke into the grounds and gardens of the village through which they passed. The animals with which they came in contact, or that were kept on the grounds over which they passed, took the disease and died. These facts I know, for I followed up every single case myself.

These animals were finally spirited away and killed, I presume, for the Cincinnati market. As they were outside of the city limits, our inspectors claimed that they had no control over them.

Within ten days after the herd was removed from Jones' wood, twenty-nine cows were put into the same pasture, where they remained, I think, about a month, when the owner observed that the animals were ailing, and the symptoms described by the gentleman from New York (Mr. Gould) were precisely those presented by these animals; that is to say, the first manifestations were drooping of the head and ears, and that marked stare which he so well described. In the early stages of the disease, the animal sought the water, lying down in it, and plunging in the nose and face up to the eyes, holding the head in that position as long as was possible without taking breath. This was only during the early stages of the disease. During this time the temperature of the body was increased, as proved by actual observations made by the thermometer. They would then leave the water, and within four days from the time of the attack every single one of them died. I have examined twenty-four of those twenty-nine cows, every one of which died within ten days. I did not find any disease of the rectum, as Mr. Gould has described; that I found perfectly healthy. If there was any change, it was perhaps a little paler than natural.

I found one symptom to which the gentleman did not refer—interlobular emphysema—infiltration of air between the lobes of the lungs. That existed in every case, and in some cases was very marked.

There were two cows that were particular favorites of one gentleman who desired to save them. They were but slightly affected, and his own opinion was that they were not at all. He took them from the herd, and put them in a lot near his house, in which were two pet cows which had been kept entirely separate and apart from the Texas cattle, nor had they been brought into contact with his own diseased cattle, until those two cows, on manifesting the first symptoms of the disease, were put into the lot with them.

Under date of September 7th, Dr. J. F. Hodgen, President of the St. Louis Board of Health, communicated the following statement to us:

In April, 1866, a lot of three hundred Texas cattle were shipped on the steamer "Lizzie Gill" to St. Charles, on the Missouri river, and thence driven to Lincoln county (about fifty miles). The stock stopped three nights on the way; in two weeks after they passed, native stock was taken sick and died, and continued to do so in those localities during the summer. * * * Dr. Mattson and his partner bought last season, a lot of cattle (native, fifty), and put them in a lot where Texas cattle (healthy) had been fed. In ten days or two weeks they began

to die of Texas fever, and continued to do so until the end of about three weeks, when he removed what remained to the country and gave them green food; only a few, and those were already sick, died.

From the observation of our health officer, the same thing is indicated. Cattle running about the stock yards where Texas cattle are received, are affected, while others near by, but kept up closely, are not diseased.

It is clear to my mind that the disease is propagated through the excrements (droppings); that these, perhaps, come in contact with the food, and are taken by native cattle, or as in one case, the grass growing on soil impregnated by the excrements, is capable of bearing the seeds of disease. At any rate, there is one very well authenticated case in which a lot of cattle were put in a pasture in May that had been occupied by Texas stock in March, and these native cattle had the Texas fever; though in this case it may still have been that by nipping the grass close to the earth, some of the excrements may have been taken into the stomach.

I think it would be well to send a commission to the Southwest next spring, and provide for an extensive series of experiments, with a view to learn by what agent the disease is transmitted. If we could be sure that it was due to droppings alone, it would not be a very difficult matter to guard our soil.

Respectfully,

(Signed)

JOHN T. HODGEN.

The health officer, under authority of the St. Louis Board of Health, at a later date, communicated the following facts through the Secretary of that Board:

• • • • • The disease appeared with the early transit of cattle East, and gradually increased until about August 1st, then declined, and on September 17th, there were few or no cases occurring. I would also remark for the information of Dr. Harris, that the disease prevailed here almost exclusively amongst milch cows. The stock yards during the summer were in a healthy condition. The native cattle transported in the same cars that had been used for Texas cattle, were not attacked by any disease here, the disease probably developing itself after they had passed on further East. A few instances—not more than five bullocks sick and dying in transit—came to my knowledge. It was among our milch cows that the great mortality took place. In all cases the animals were permitted to run abroad, and, as the open pastures in the outskirts of our city that they frequented for food, were almost daily traversed by Texas cattle, it was there, I conceive, that the seeds of the disease were obtained. I met with, or heard of no cases among cows kept confined either to stables or their own pastures, except one instance. A large dairyman, in June, purchased some forty head of cows in Illinois. Shortly after arriving at his farm a disease appeared among them from which they died rapidly. The disease did not show itself among his old stock; this may have been due to the segregation of the Illinois or sick ones.

From the best sources of information at my command, I would say that the disease has never wintered over here. Cold weather destroys the germ as effectually as it does that of yellow fever, and it is only on the advent of Texas cattle that it appears again. During the war there were no Texas cattle and no disease.

Cherokee cattle are accused by drovers of carrying the disease, whether justly so I cannot say.

I speak of the disease among our milch cows as the "Texas disease," but whether it was the same that formerly attended the passage of Texas cattle, I cannot posi-

tively say, as no correct descriptions of the disease as it formerly appeared could be obtained. I can neither say that it was identical with that disease as it existed the past summer in various parts of the country. The various reports, as made up in various parts of the country, must be compared before this can be determined. Of one thing I feel convinced, viz: that I have traced the disease here in many, many cases to a Texas poison—i. e., that all the sick had frequented the trail or passage way of Texas cattle, and that there they received the germ that caused their death.

From my own observations with the scalpel alone, the organs most usually diseased were the kidneys, spleen and liver. Without entering into a description of the changes found in these organs, I would conclude by stating that the disease seemed to be one of blood poisoning, the result of a special germ imparted in some way by Texas cattle. That no one organ was invariably and similarly affected in all cases, and although the kidneys, spleen and liver were in all instances more or less affected, yet one or the other of these organs would seem to have been *specially* attacked in different cases.

Very truly yours,

JAMES W. CLEMENTS, M. D.,
Late Health Officer of St. Louis.

The Mayor of Akron, Ohio, communicated to us the following information, under date of September 10th:

* * * * In reply to your inquiries, under date of August 16th, I informed you that we had not seen a case of cattle disease in this part of Ohio. By the enclosed statement you will perceive that it has broken out in this and an adjoining county, through which Texas cattle were driven. These cases have proved the disease to be communicated by cattle being driven over a road upon which diseased cattle have traveled.

Respectfully,

L. V. BINN, *Mayor.*

To Corresponding Secretary and Registrar, M. B. H.

The following is an abstract of the facts alluded to, and furnished by this intelligent executive at Akron:

About two months ago a drove of some ninety head of Texas cattle were driven through the north part of this county, Northfield and Twinsburg, on the way to Mantua, Portage county, where the owner thereof, a Mr. Frost, resides, and where said cattle are now being kept. While in attendance at the fair at Twinsburg, on Thursday last, we learn that the disease in question had broken out upon the farm of Mr. G. W. Dresser, on the line between Twinsburg and Northfield, near Macedonia, at which point said Texas cattle had made a slight halt upon their journey; while it was asserted by some, and denied by others, that large numbers of the Texas cattle had also been stricken down with the disease upon the farm of their owner, in Mantua. Desiring to ascertain the facts in regard to Mr. Dresser's herd, in company with M. C. Read, Esq., of Hudson, and J. P. Alexander and R. B. Walker, of this city, we visited the farm of Mr. D., who kindly gave us all the information in his possession in regard to the matter.

It appears that a tenant of Mr. Dresser, living upon the north side of the east and west road, by the name of Maloney, having three cows which he had allowed to run in the road, had lost two of them suddenly, by the disease in question, a few days previously; while one cow, out of the large herd of dairy cows owned by Mr. Dresser, which, in going to and from pasture, had passed over the track of

the Texas cattle, had also died from the same disease, the day before, after two or three days' illness only.

From M. C. Reed, Esq., of Hudson, Ohio, after a personal visit and examination at the place infected by the disease, we received a full account of these cases in Summit county. Though Mr. Read went about this inquiry fully persuaded in his own mind that it was only an endemic and local disease, the following points are so well stated and so instructive that we present them to show how well the Summit county outbreak corresponded with all that we know concerning the propagation of this malady. Mr. Read says:

* * * * * The Texas cattle were taken from the cars at Brighton, about the first of July, and were slowly driven by way of Independence, Bushnell, Northfield, Twinsburg, Hudson and Aurora, to Mantua, where they now remain. The pastures were short and poor on account of the protracted drought, but the feed was more abundant along the sides of the roads, our laws restraining animals from running at large being generally well obeyed. The men in charge of the Texas cattle herded them at night in yards, &c., without feed, and then, during the day, permitted them to feed in the streets.

They reached Northfield July 4th, and the drovers permitted them to feed some time in the street, and at night shut them up in yards on Mr. Dresser's farm. They started them early in the morning, but again permitted them to feed for some time in the street. Within about fifteen minutes after these cattle were turned out of the yards, Dresser's cows were driven into it to be milked. A near neighbor, a Mr. Maloney, had at the time three cows and a calf, running in the streets. About the first of September the disease appeared among these cattle, and they were also found to be covered with the ticks. All of Mr. Dresser's cows, when I saw them, had more or less of the ticks on them, not a large number that were fully grown, but a multitude of small ones; some of the cows in apparent good health having many more of them than those that took the disease. He lost two cows; one died, the other was killed after the case became hopeless. I was at his farm yesterday; his cattle are apparently in good health and the ticks have disappeared. Maloney's three cows died; the calf, which, according to Mr. Dresser's statement, was literally covered with the ticks, did not take the disease. A Mr. Munn, of Northfield, living a little west of Dresser's, and on the route the Texas cattle were driven over, lost one cow. This cow was driven to pasture through the street. On careful inquiry, I am satisfied that the above is a full list of the deaths among the cattle in that neighborhood, which there is any reason to attribute to the presence of the Texas cattle.

Hon. Peter Hitchcock, a distinguished citizen of Geauga county, Ohio, has communicated to us the following facts:

* * * * * In Portage county, I think there has been none of the disease except in one township adjoining Summit county, where it was brought by a herd of Illinois steers, and if I am correctly informed, the same cattle that, coming through Summit county, left the disease there.

In this county (Gauga) there has not been a case of the disease. Of this I am very well assured. In Lake county I am quite familiarly acquainted with the cattle men of the county, and I am just as well assured that there have been no cases there, except what happened upon the line of the Lake Shore railroad.

Painesville, upon the railroad, is a point where much the larger proportion of the

cattle from the South and West, passing over that railroad, are unloaded, fed and reshipped; and my impression is that the herd to which you refer, as from Painesville, was really a herd of western cattle, falsely shipped as from that place, or else a herd that took the disease from an infected yard or car.

In answer to your inquiries, I would state that the "first cases" of which I learned were in Aurora, Summit county, taken, as I understand, from following in the track of the Illinois herd, to which I first referred. The exact date I cannot give, but suppose it was the same as that of the cases of which you were informed by Mr. Reed and the Mayor of Akron.

The disease, so far as I have known, depended upon exposure to grounds over which Texas cattle had been driven recently.

Very respectfully, your obedient servant,
(Signed) P. HITCHCOCK.

The foregoing extracts from the correspondence are quoted chiefly with the view to convey the information and records therein embodied in the precise words of the respective writers. There was considerable correspondence with the State Commissioners and Assistant Commissioners, and with various persons engaged in handling cattle, but as all the points of information which such correspondence contains are embodied in the report of Dr. Morris* in this volume, no further mention need be made of it in this place. But there is one point that ought to be mentioned here, namely, that the Board's correspondence has been an important means for imparting information to great numbers who sought it, and also for securing close observation and a reasonable supervision of the disease throughout the country.

During the progress of the infection in the country, there was reason to apprehend that, on the one hand, reasonable fear of the introduction of the disease into healthy herds might lead to embarrassments in the beef supply in the cities; and that on the other hand the drove-men and butchers—true to commercial instinct—might push dying and hopelessly infected beeves upon our city meat markets, as, in fact, Assistant Commissioner Morris ascertained was continually attempted. To prevent or largely control these evils was an incidental and very important object, both kept in view and actually attained in the Board's correspondence. The daily press also discreetly sustained all the sanitary and police measures which the Board recommended, so that entire success was given to the endeavors of the sanitary officers, as regards their advice, as well as their acts. To insert here the entire correspondence, &c., relating to these matters, would needlessly burden this report with details; but we here introduced so much as seemed necessary to show what was the precise nature of the information obtained by us in the correspondence.†

* It is deemed desirable that so far as the disease came under Dr. Morris' official observation, it should be consecutively presented by him. As Assistant Commissioner for the State, he embraced every opportunity personally to see examples of the disease in different localities, and to aid the Board of Health in procuring the most correct information concerning the infected herds in the State of New York.

† Portions of the correspondence that related to strictly scientific inquiries, will be found in the succeeding section of the report.

ABSTRACT OF AUTHENTICATED EVIDENCE OBTAINED FROM VARIOUS SOURCES.

The earliest information of which the writer of this report had any information concerning the "Spanish fever," or Texas Cattle Disease, related to the spread of the disease from the fords of the Osage river some time before the war of the rebellion. The earliest published account of it that has any definiteness and value, is embodied in a report upon it by Dr. Albert Badger, of Nevada City, Vernon county, Missouri, and published by the Missouri State Agricultural Society in 1866. From that report we extract the following well stated points:

This disease was first recognized as having been propagated by cattle driven from Texas some twelve or thirteen years ago (that is in 1852 or 1853), the disease having been in this county (Vernon) two seasons previous to its having been traced to Texas cattle.

From the first, it was found to be confined to the great roads or highways running through the county from the south, and finally it centered on the Texas cattle in the year 1853, by its being (discovered to be) confined to one highway through the county over which these cattle passed that year. On this road the disease was fatal, killing about fifty per cent of all the cattle along that road, and persons living near the water-courses, over which that road crossed, lost as high as ninety per cent.

The symptoms of the fever and its fatality are agreed to by every person. The fatality is much greater in a *warm and dry* summer than in a cold and wet one, and the disease always ceases when the frosts and freezing weather have killed the vegetation.

Dr. Badger goes on to give perfectly accurate descriptions of the symptoms of the disease and of the appearance of the sick cattle. His description of two classes of cases, or, rather of symptoms and phenomena, produced by the blood poisoning in the last stage of the disease, is true to the life, and exceedingly instructive. He narrates the circumstances by which the farmers of Vernon county discovered the real source of the infection that entered their herds; also shows conclusively that the disease entirely ceased during the four years of the war, and that the first case of the re-introduction of it occurred in the autumn of 1865, when two pairs of oxen were bought in the South by a Mr. Box, and immediately infected the herds of three of his neighbors.

In June, 1866, a drove of Texas cattle passed through Vernon county, and about eight miles into the adjoining county of Bates, when the citizens resisted their further progress northward, and compelled them to return into the Indian territory by the same road they had entered Vernon county. The disease did not appear for some six weeks; and then it prevailed more mildly than usual, yet it killed about forty per cent of the native herds. It extended directly up to the very point, on the roadsides, at which the Texans had been turned back, and not a farm beyond that point.

Mr. John H. Tice, a citizen of St. Louis, makes the following statement concerning his early experience of the disease at Cheltenham, near that city:

The first cases I saw were in 1858, five miles west of St. Louis, in a drove of one hundred and eighty head of cattle, three-fourths were Texans, and the remainder native stock. In a few days after their arrival, the disease broke out among them; the first died on Saturday evening, and by Monday morning there were twelve dead, every one of them being of the native stock. The pasture was isolated, excepting on one side adjoining the turnpike.

In 1860 there was a large drove of Texas cattle opposite to the above named pasture, and south of the road. Some of the drove died. The disease soon appeared in the neighborhood cattle, nearly all of them being cows. I lost three cows.

About the middle of October, 1866, some derangement occurred in the machinery of a cattle train opposite to my house, and the train was detained somewhere about three hours. On the train were Texas cattle, and as some Irish people employed on the road lived there, and who during the morning and evening pastured their cows within the enclosed railroad, I went and advised them not to let their cows in. One of them did and one did not. The cow let in was a very valuable one, he having paid a short time before eighty dollars for her. In about ten days she sickened with the Texas fever, and died in a few hours. She pastured on the common when taken sick, with the neighborhood cattle. But the day after she died (on the 30th of the month), we had the first killing frost of that season.

During the summers of 1856 and 1857, Texas cattle were brought into the States of Kansas and Iowa in great numbers, and it is stated that the native stock was swept away by a "dry murrain" that prevailed along the trails traversed by the Southern droves. The newspapers of those dates, and of 1858, mention the singular circumstance that the course of the disease seemed totally arrested at the banks of any deep stream of water, excepting at the points where the Texas cattle found fording places, at which they crossed. From 1858 to 1861, the disease prevailed along various routes traversed by Texas herds in Missouri, Kansas and Iowa, and in the latter year laws were framed by the Kansas Legislature to regulate the movement of herds from the South. Similar laws were enacted by the Legislatures of Missouri, Illinois and Kentucky, and all of them are based upon the evidence of common observation of the disease, introduced and propagated by the presence or even passing of cattle from Texas and the Indian territory, bordering on Texas.

That this exotic disease wholly ceased in all the States here mentioned during the war of the rebellion, is a fact well established; and that it sprang into existence immediately after the war, along the trail of Texas cattle, which again were introduced as soon as the obstruction of military lines had ceased, is a fact equally well established. Even in the famous Blue Grass regions in Central Kentucky, the disease made its way in 1866, as the following instructive instance strikingly illustrates: A drover brought a steamboat load of Texas cattle up the Mississippi and Ohio rivers, and, landing them at Louisville, drove on to Lexington, which is in

the central part of the State. This drove was moved to Georgetown, and wherever the native stock of the districts chanced to graze upon the roadsides or pastures that were thus traversed by the Texans, the former were in the course of two months almost entirely swept off by the cattle disease. A drove of fat cattle that chanced to follow close upon the trail of the Texans were all attacked and all died. A Mrs. Duke, in Georgetown, who had a fine dairy herd, lost forty of her cows in consequence of their temporary exposure to the grounds that had just been traversed by these Texans. These facts are all vouched for by Mr. Benjamin Johnson, of Arcola, Illinois, who brought that herd of Texans into this most healthful and highly cultivated section of Kentucky.

Mr. V. P. Chilton, of southwestern Missouri, has stated to the Commissioners of the Illinois Agricultural Society, that as a resident of that section of country, both before and ever since the Texas cattle began to be driven through it (since 1849), he has observed the following facts:

1. That beyond a doubt, the disease is communicated from feeding or watering with or after Texas cattle. He says:

I have never yet known a case that could not be traced directly to this cause.
 I have had my own cattle separated from large herds of Texas cattle by a fence, without any evil results, and of the immense number that have died on this road, none have died on pastures from which Texas cattle have been excluded. The instances to sustain this view are so numerous that I will not undertake to give them. My opinion is, that the poison is taken into the stomach with their food or water; the greatest danger being in watering in stagnant pools after infected stock, the known habit of cattle when watering, leaving much fetid and feverish matter in the water. In very hot, dry weather it is not safe to let cattle upon ground that has been used by diseased cattle for at least eight weeks after they have been removed, as I have twice known the disease contracted nearly that length of time after they had vacated it, and immediately after hard rains when it was thought the disease had been swept off by the water, but it was only washed into the water-pools with their droppings, and new energy given to the virus.

This intelligent observer adds:

Cattle that have been here a few months, seldom impart the disease. The fatality in cows appears to be greater than in steers. The disease is much more virulent in some seasons than in others, the excessive heat of this summer (1868) causing it to be worse than usual.

Experience at Cairo.—This chief point of transshipment of cattle from steamboats to railroads during the summer of 1867, in consequence of State prohibitions against the movements of Texas cattle over the routes of Kansas, Missouri and Iowa, early became a seat of the Texas plague. The first lots that communicated the disease were landed from Texas, by way of New Orleans, on the 23d day of April, the second on the 26th, and so on, about thirty thousand head having been disembarked at this point during the spring and summer of 1867. The boat loads that first arrived seemed to be in perfect health; but as the hot weather drew on many

Texas steers died on the boats and in the Cairo yards. The cattle were allowed two days for rest and recruiting after debarkation from the steamboats before being shipped northward upon the railroads, and it is stated that from twenty-five to thirty cattle died daily in the yards and about the levee during the hot season at Cairo. The farmers in the vicinity of Cairo, suspecting no danger, permitted their native stock to mingle freely with the Texas cattle. But their cows began to perish by the disease early in June, and this fatality continued to increase until it plainly declared the presence of an epizootic. This lesson was not forgotten, for during the past summer of 1898, the farmers very carefully kept their cattle out of the way of all contact and exposure.

Facts Showing the Probable Period of Incubation.—These facts appear to consist of two classes: First, the deduction from records of the time from first exposure to the fresh trail of infected Texas cattle, or the time which elapses from the first arrival and presence of the Texas cattle and their excrements to the date of the first outbreak of the disease in native herds; second, the time that may elapse between the first exposure and the first symptoms in native cattle, when that exposure is known to have taken place after the infected grazing grounds or cattle trails had become actually capable of communicating the disease. In other words, there is a distinction to be made between exposure to the infection itself (i. e., the contagium of the disease) and the mere exposure to the Texas cattle directly, or to their trail *immediately* after they passed.

With this preliminary remark, we quote the following facts: 1. At Cairo, in 1867, nearly six weeks elapsed after the landing of the first five hundred Texans before the native cattle began to die by the imported infection; but after the outbreak had declared the presence of the infection, the period that elapsed between the exposure of native stock and the onset of fatal symptoms was scarcely four weeks. 2. At Whitehall, Illinois, Mr. Gregory put two hundred and fifty-five Texas cattle into one of his pastures, in which fourteen native steers were grazing; this was done on the 20th day of June. July 18th, one hundred more Texans were placed in that pasture, and July 29th he put in forty fat natives. Three (3) native cows were also all this while grazing in this pasture with the fourteen native steers, and after a lapse of forty-one days these natives also had the companionship of the forty which arrived on the 29th of July. The following is the record of dates, etc., of the attacks that followed: (a.) August 8th, two of the three cows died, the other one having been sent away several days previously. (b.) August 10th, one of the fourteen steers died. (c.) Five days later, the fat steers that came in on the 29th of July began to die, and these continued to die at the rate of five per day, until forty-four out of the fifty-four had died. (d.) Five cows, some Texans and a buffalo were placed in a pasturage together on the 20th of June, and on the 8th of August one of these five cows died. (e.) July

17th, there were forty-seven native cattle and two hundred and forty Texans placed together in a pasture; they have shown no signs of sickness.

Mr. Groes, a farmer living in Sangamon county, received a drove of cattle on the 16th of June directly from Abilene, Kansas, and placed sixty-two of them in a one hundred acre prairie pasture, where there were thirty-five native cattle grazing. Twenty-six days after receiving the Texas cattle he removed two of the natives that had fed with them during those three and a half weeks, and placed them in a fresh pasture where there were no Texans; after twenty-four more days had elapsed, namely, on the 5th of August, the Spanish fever appeared in that herd of thirty-three natives. The two other natives that had been removed were now returned to their companions, and they continued healthy until the end of the season; but in less than ten days after the disease appeared in that group of thirty-three that had remained longest with the Texans, nineteen of them died.

This case, like that on Mr. Gregory's farm, seems to show that the infectious principle, or *contagium* by which the disease is spread from place to place, either requires, *first*, a period of several days, and perhaps as long a period as four weeks, to develop it from the excrement of the Texas cattle as deposited on the ground, to such maturity as to render it sufficiently active to propagate itself; or, *second*, it requires that the individual cattle which have freshly arrived from the Texas and Indian Territory cattle-trails, and whose incubation of the poisonous cause of the disease chances to be yet incomplete, shall continue their incubation of it until it becomes capable of reproducing a crop of its deadly growth. None of the cases thus far quoted serve to determine which of these conditions it is that must explain the curious facts in the instances here mentioned.

The experience upon the great farm of Colonel J. T. Alexander, in Champaign county, Illinois, throws additional light upon the important question which we have here raised. On the last day of May, 1868, four hundred freshly arrived Texans were placed upon his farm at Broadlands, upon a prairie pasture on which one hundred native oxen were grazing. The Texans remained in that pasture only one day. June 7th, two hundred and twenty-six more freshly arrived Texans remained one day in the pasture here mentioned. June 18th, four hundred and ninety-six more of the same kind, freshly arrived, were allowed to remain in the same pasture three days. June 21st, three hundred and forty-nine more arrived and remained there one day. June 25th, five hundred and thirty-seven more, by the overland route through Kansas, arrived and were placed in another pasture where twenty-two native cattle were grazing; and on the 30th of June, one hundred more arrived by the same route, and were placed in still another pasture with native cattle. July 26th, disease appeared among native cattle, and during the week it was observed in several different pastures. Now, concerning the one hundred oxen—native cattle—that were grazing in the great pasture which, from the last day of May until the 4th of July, had continued to be a sort of hotel-ground for the grazing and rest of immense herds of freshly arrived Texans day by day, but only for

a day or two in each arrival, the following facts appear: (1.) These one hundred native oxen continued in the great pasture until July 1st, when they were all removed to a pasture in which there had been no Texan herds. (2.) That on the 14th of July twenty-seven of these one hundred oxen were removed to a pasture that had, for some time, been grazed upon by Texas cattle. Two weeks afterwards several of these twenty-seven sickened, and in the course of the month nearly all of them had the Texas Cattle Disease, and many of them died. In another lot of native cattle, twenty-six in number, which had grazed for twenty days with freshly arrived Texans in a pasture, namely, from June 10th to July 1st, not a case of the disease occurred, the cattle remaining healthy until the end of the season; they were removed from the Texans at the date last mentioned and placed in a pasture where no Texans had grazed. But a numerous herd of the companions of these fortunate twenty-six, that remained in the pasture where they had together grazed with the Texans during the last twenty days of June, and thenceforward for a month continued to graze upon the same pasture alone, before the middle of August were nearly all dead by the disease. These facts are all vouched by Mr. C. L. Eaton, the very intelligent superintendent of the Broadlands farm.

The experience in the Chicago stock yards was peculiarly important. We have already stated many of the facts in our chapter of correspondence, and we will here add a few more statements which seem important in the history of the disease in that neighborhood. Dr. Rauch, the Sanitary Superintendent of Chicago, says:

* * * * * The first case at the Union stock yards, which terminated fatally, occurred July 25th, soon after the arrival of the train that brought the animal there. Two days after, two dead steers were found in a train that arrived from the infected district (Tolono, in Central Illinois), with several animals suffering from the disease. The next day, another train arrived with diseased steers in it. This train was not permitted to remain. On July 29th, a cow died, belonging to a citizen of the Fifth ward.

The number of deaths increased daily until the 20th of August, particularly in the Fifth ward, when they began to diminish. In order that you may understand the history of this plague, I will state that the Fifth ward comprises a large territory, the greater portion of which is unoccupied, and in its primitive state, in the extreme southwestern portion of the city, adjoining the Union stock yards, and where, for the purpose of economy, herds of Texas cattle were grazed at intervals while awaiting sale, from the month of May until the action of the Board prevented it, in August. These animals were also grazed upon the prairie, east, south and west of the stock yards. No herds were at any time permitted to graze east of the Pittsburg and Fort Wayne railroad. * * * * * On this ground, the cows belonging to the Fifth ward grazed, and where the Texas fever prevailed most, and the greatest mortality occurred. A large number of cows grazed east of the Pittsburg and Fort Wayne railroad, but none of them were affected, with the exception of a few which were in the habit of frequenting a spot below the city limits, on the line of the Illinois Central and Michigan Central railroads, connecting with the stock yards, where the cattle cars were cleaned.

These cows belonged to citizens of the Fourth ward. Other cases occurred near Calumet Junction, Summit, Lyons, and south and west of the stock yards, where herds of Texas cattle had been driven, or grazed, or where infected native cattle had been sent from the stock yards. One case occurred in the Seventh ward, of a cow that had been purchased several days before from a farmer living near Brighton, but which, at the time of purchase, showed no signs of the disease. As far as we have been able to learn, one hundred and forty-seven milch cows, one heifer and four steers, belonging to citizens of the Fifth ward, died between July 27th and October 10th. At the stock yards, thirteen steers died; in the Fourth ward (the extreme southern part of the city, and east of the stock yards), ten; and in other parts of Cook county, as far as heard from, ninety-five. Of the animals condemned and killed at the slaughter-houses, there were seventy-eight. In these, the disease was so well marked that it was unmistakable, while a great many were found, in the incipient, and still more in the convalescent stage, so that the Board did not feel unwarranted in condemning the animals. This was particularly the case with regard to the Texas cattle; six of these were found suffering with the acute symptoms so well marked that they were condemned, making a total of four hundred and one animals that died of this disease, and were slaughtered within the limits of Cook county.

The following observation concerning an important symptom, was made by Dr. Rauch:

So far no notice in the description of the symptoms of this disease has been taken of the chill by which it is ushered in, nor the urination. With regard to the first symptom, I would state that three cases fell under my observation in which this was well marked, and I have no doubt but that such was the case in nearly all the animals that suffered. * * * * *

With regard to the transmittal of this disease by native to native cattle, I must confess, that notwithstanding the weight of the testimony against it, I am inclined to believe that such can and does take place. I can see no good reason why such should not be the case. * * * Several instances of this character fell under my observation during the past three months, but the most conclusive evidence I have is, that native cattle were purchased at Chicago in August, and taken to Lebanon county, Pennsylvania, and that a short time after they died, and that other native cattle on the same farm and neighborhood died, and that no Texas cattle had been near the place.

Mr. Hill, of Tolono, a little town in Illinois, where large numbers of the Texas cattle arrived from Cairo and from the railroad depot, stated the following facts concerning the experience in which he had participated as a citizen of the place. He says:

Our little town is situated at the crossing of the Great Western and the Chicago branch of the Illinois Central railroad. Great preparations were made there last spring by the Illinois Central railroad, and many thousand dollars expended, in building fine cattle pens and barns, which, although the road denied it, we supposed were intended (as the fact turned out to be), for the purpose of facilitating the importation of these Texan cattle. The first train containing any arrived on the 29th of last April, and they continued to come until late in the summer. About the 10th of June, the cattle disease broke out, and continued to rage as long as there was material for it to work upon, until nearly all of our cattle fell a prey to

it. Among the few left, the disease still continues to work, one gentleman having lost some fine steers only last week. On the 5th day of September, within a radius of two miles of the town, I think there were *but two milch cows left*, and up to that time, seven hundred and twenty-six cattle had died in that little township, which polls but a trifle over two hundred votes, since which time two hundred more have died.

Concerning the isolation or quarantine of herds, as a means of arresting the spread of the disease, Mr. Hill states the following facts:

Some facts have been stated in regard to Mr. Larmon's cattle, and the disease not being communicated to them across a fence. As I am a near neighbor of his, I will just state what I know about that. His cows were among the last that died; but they did die, notwithstanding that they were enclosed, I think, by a common five-plank fence.

The district around Tolono having been so thoroughly infected that only two of the native cows remained alive after the 1st of October, it does not appear strange that this pasture of Mr. Larmon should have become infected at last. Mr. Hill does not inform us in what manner the water drains into or from Mr. Larmon's pasture, and there are several instances known to us in which pastures and yards which were receiving the water shed of infected grounds and Texas cattle beyond their enclosure, and in that manner apparently became infected in turn, yet had not been actually visited or trodden by any Texas herds or other sick cattle before the disease sprang up among the native cattle, in the manner which Mr. Hill has well described in Mr. Larmon's case.

Mr. Hill, whose testimony seems to us peculiarly straightforward and logical, has recently given an account of the prevalence of this Texas epizootic among the horses of the same district in which the cattle had been swept away before the horses began to die. He regards it as the same disease. He gives the following important evidence upon the two questions: (1.) Does the *contagium* of the Texas Cattle Disease persist in its activity long after the cattle have been destroyed by it in the pastures? (2.) What is the period of incubation in pastures that have become infected by this contagium in its full destructive force, or more mature stage of development?

(1.) *Answer.*—After our cows had all died out, some eight or ten were brought from Edgar county; they had never been exposed to the Texan cattle ranges or trails, excepting as it was necessary for them to cross where Texas cattle had been driven. They were sold in our place, and part of them have died. * * *

(2.) Besides these cows, a large herd of native cattle that had not been in any manner exposed to the Texans, were brought into the town and pastured upon the same grounds where the disease had prevailed so fatally. In about three weeks they began to die, and continued to die until nearly all were dead. One farmer, alone, lost seventy previous to the first of November.

Mr. Moore, of Missouri, states the following interesting facts concerning the destruction of native stock taken southward to the borders of Texas.

overland. His testimony is corroborated by an abundance of testimony of the same kind which has come into our possession.

Some freighters, about to cross the plains, selected native and Texas cattle, herded them and fed them together during the winter; made up their teams in the spring, and started across the plains with all their animals apparently well. When they had got half way across the plains the native cattle were all dead, and the Texas cattle were left to make the journey alone. These are the facts communicated to me by a gentleman who was with the train, and knew all about it.

There is abundant testimony to the fact that Northern stock, particularly that which is well bred, seldom survives the acclimating diseases which they suffer upon being taken southward beyond the Arkansas and Osage rivers. But the nature of the acclimatizing disease is not yet well known to us. The Agricultural Bureau of the General Government, at Washington, collected important information upon this subject nearly ten years ago. (See Reports of the Agricultural Bureau, Department of the Interior, 1860.)

THE "TICK" THEORY CONCERNING THE DISEASE.

As some of the largest losers of cattle by the disease in the West came to the conclusion that the vermin known as "wood-ticks," which infested the skin of nearly all the newly arrived Texas cattle, were in some way the cause of the infection to native herds, we requested a friend who had examined into the history of the disease of the "tick," in Summit county, Ohio, to communicate the results of his investigation. The facts are simply these: The doctor and the farmer believed without evidence, simply in view of the fact that the "tick" seemed universally present with the infected herds, that the vermin served in some way as the cause and carrier of the disease. Our correspondent, M. C. Read, Esq., of Hudson, Ohio, forwarded to us specimens of the "ticks," and called attention to the following description of them by Cuvier:

Ixodes reticulatus (Lat., Fab.); ash colored, with small spots and small annular lines of a reddish brown; edges of the abdomen striated; pulpy; almost oval. It attaches itself to oxen and is, when swollen up, five or six lines in length.

Texas cattle usually become extensively covered with these "wood-ticks," before leaving their native grazing grounds, and when they arrive at the North, during the early part of summer, they bring myriads of these vermin upon their skins. The cattle, as we are informed by Mr. Read, and several other correspondents, have never been observed to make any attempt to remove these vermin off their hides by teeth or tongue. And we need only quote the statement made, concerning this species of *Ixodes*, by B. D. Walsh, Esq., of Rock Island, Illinois, one of the most learned entomologists in our country:

There is a prevailing opinion amongst certain classes, that the ticks which are found on the cattle which die of Texas fever, are actually the cause of the disease. In view of this fact, specimens of these ticks have been sent us for examination,

from different localities in Illinois, and they are identical with those we have ourselves examined upon diseased cattle in St. Louis,* and are but the common cattle tick. It is exceedingly improbable that they have anything to do with the disease, although it is barely possible that they may communicate the infection from the Texas cattle to our native herds. (See *American Etomologist*, Vol. I, No. 2; St. Louis, October, 1868.),

IV. OBJECTS OF SCIENTIFIC INVESTIGATION, AND DESCRIPTION OF METHODS ADOPTED.

Plainly enough there are two leading and co-equal objects which demand that thorough investigations shall be made concerning whatever pestilential disease occurs in the animals that are used for human food. The first object relates to the ascertaining of the nature and effects of the special disease in the sick animal, with reference to the results to be feared or anticipated when their flesh is used for food; and the second object of investigation has reference to the discovery of the hidden and preventable causes of the pestilential diseases which afflict animal life, and with an ultimate and very special reference to the use of such knowledge in unfolding the natural laws of epidemics, and the practical principles of hygiene.

First Object of Inquiry—The Diseased Food Question—That animals dying or killed when suffering from a pestilential and destructive disease, or when slowly undergoing the incubative effects of an infectious poison or ferment that at the full term of the incubation shall destroy life, would thereby be rendered unfit for human food, might seem to be decided, without argument, in the affirmative. But common observation has shown that not every kind of disease of the lower animals is noticeably pernicious as food when the flesh is cooked; and as the beneficent laws of our physical organization do actually provide in some degree for the protection of human life against many of the perils of defective foods, it has come to pass that the empirical conclusion has been drawn very boldly, that no cooked meats, however much the animals whence the meats were obtained may have been diseased, will produce disease or sickness. But this is a preposterous doctrine, and it is as absolutely untrue as it is illogical.

This report is not the proper place for examining into the whole subject of diseased foods, so we will simply state the questions that had to be considered by the Committee of the Board of Health in regard to the matter.

1. In consequence of an enormous increase in the death-rate by diarrhoeal diseases, and especially in view of the fact that a sudden and utterly obstinate and incurable class of choleraic diarrhoeas in adults, and in children past the age and diet of infancy, had very rapidly increased during the last weeks in July and the first two weeks of August, in New York, we repeat what we have previously stated, that the chief incentive to our first search for the presence and characteristics of the "Texas Cattle Disease," had special reference to the well formed purpose to arrest, discover and control whatever removable causes of disease could then be found operating upon the population of the metropolis. During the first ten days of August, the Registrar personally visited twenty-five sick, dying or dead persons to discover what local and domestic causes of choleraic disease might be present in the places where such sickness was occurring. At no

hour of the night was he free from this duty of visiting cases of sudden sickness of this kind. Familiar as he was with Asiatic cholera and all forms of summer cholera, he found ample reasons for doubting if all the causes of this class of choleraic diarrhoeas then prevalent, were adequately known and controlled. The precise state of our anxieties and of the general estimation of removable causes of some of the diarrhoeal disease at the end of the first week of August, is correctly set forth in the note which accompanied the mortality records for the week ending August 8th, as usually submitted to the Board of Health. We quote a paragraph to show how medical officers regard the duty of searching for and restraining the sources of such excess of diarrhoeal diseases:

* * * * *

There were 751 deaths in New York last week, and 267 in Brooklyn, against 730 and 233 in the respective cities the previous week. * * * * * Acute diarrhoeal diseases are charged with 203 deaths in New York (40.34 per cent of the total mortality), and with 142 (53.18 per cent of the total) in Brooklyn. We regret to see that the fatality of this most preventable kind of disease, the unerring indicator of foulness and putrescence in domestic surroundings or in food articles, continues to increase, and there is just reason for saying that impure and injurious food has been sold in the markets of New York and Brooklyn. * * * * * And the fact must fearlessly be told that it is a crime against life to offer for food any portion of the flesh of the sick and infected animals that may for several weeks continue to be sent forward from the West. It is idle to talk of such meats being safe and wholesome for food. Medical officers are in duty bound to know the truth on this subject, and to advise accordingly.

Such was—and we believe such should be—the view taken of the use of the flesh of diseased or infected animals for food, especially when, by the symptoms of the sickness, the disorder is pestilential. How urgently important is this view of the case, when there is a deadly prevalence of bowel disorders in the community? And as sundry correspondents in newspapers, and some persons of fair authority in veterinary science, have expressed the opinion that the flesh of diseased cattle is harmless, it is but proper that we should quote here a paragraph from a letter of information which we received from Prof. John Gamgee, the distinguished veterinarian, who is at present in this country, then writing from Kansas City, Missouri, under date of August 22d, after having examined scores of the dead and dying cattle, and after having discovered the same disease in Texas cattle that were awaiting transportation from Kansas. That gentleman remarked, that “no sanitary officer can, for a moment, sanction the sale of the meat of diseased animals, whatever the disease for which they are slaughtered.”

As medical and sanitary officers we do not feel at liberty to pass lightly over the questions that are involved in the consideration of this first object of scientific inquiry and sanitary regulation, in regard to the foods derived from sick and infected animals. But as we cannot, in this brief report, properly take up the several questions that relate to this important subject, the following statement of the main points in the argument against the use of diseased animal food is submitted:

First.—The origin and early stages of various disorders of human health, especially of those affecting the healthy condition of the blood and secretions, and the digestive and the depurative functions, and also certain degenerations of vital organs and proximate elements of the human body, are very reasonably believed to be often dependent upon faulty food and consequent faulty assimilation; and as the peculiar manner in which the flesh of diseased animals sometimes operates as a virulent cause of fatal blood-changes warrants the conclusion that such food, even when cooked, produces its deleterious effects by operating as a morbid poison or ferment (*zyme*), every medical officer is in duty bound to discriminate rigidly against those special diseases of animals that destroy by means of pestilential disintegration or zymotic transformations in the blood and fluids of the diseased creatures. The entire class of anthrax fevers or anthracoid diseases, and all those diseases that are known by the term "braxy," are to be regarded as *liable*, though *not certain* in all cases, to beget disease of a fatal kind in man or beast, if used for food. Testimony on this subject is clear and strong.

That the diseases we have just mentioned, as well as the rinderpest, the contagious pleuro-pneumonia, and the bovine-typhus, and all the disorders which the Germans term *milzbrand*, should not, in a majority of instances in which the diseased flesh is used as food, actually produce fatal results or any recognized disease in the persons who partake of the food, is neither strange nor important in this argument. Not every child takes scarlatina or the small-pox when exposed to the contagia of those diseases; and, on the other hand, not every human stomach will destroy, and not every human body will certainly and completely eliminate, all noxious elements from the circulating blood. So, also, in and upon some persons parasites will grow and propagate, while other persons will resist such depressing maladies.

In regard to our earlier opinions concerning the essential nature of the Texas Cattle Disease, we should here mention that until it was discovered that a cryptogamic organism was constantly to be found in the blood and bile of the infected animals, we believed that the malady would be found closely allied to the anthracoid and braxy diseases described by European pathologists. The cryptogamic and contingently infectious nature which we now know that the malady possesses, enhances the theoretical importance of restrictions against the use of such flesh for food. And, in regard to the whole subject, nothing could be said more appropriately than has been said by the learned and most practical of hygienists and pathologists, Prof. Edward A. Parkes, in the following remark:

We should conclude from general principles that all diseases must affect the composition of flesh, and as the composition of our own bodies is inextricably blended with the composition of the substances we eat, it must be of the greatest importance to health to have these substances as pure as possible.*

* *Practical Hygiene*, by E. A. Parkes, p. 161.

In his fifth and seventh annual reports to the privy council of England, the chief medical officer, Dr. John Simon, takes up this question with a masterly grasp, and he arrives at the same general conclusions as that which Prof. Parkes has so well expressed. In the light of experience and the most advanced knowledge, therefore, the terms in which the decision of the Metropolitan Board of Health was set forth by its special committee on the 13th of August will stand as a safe and good rule.*

The Second Object sought in the Investigations.—Search for the Causes of the Epizootic malady with reference to the Laws of Epidemics.—The skillful study of epizootics, especially those which affect the bovine species in open pastures, and in their removals or migrations from their native ranges of grazing, etc., has in the past half century, added much important information to the stock of medical knowledge concerning the causes of certain endemic diseases, and concerning various important questions in the pathology of such maladies. The human family has for seventy years been enjoying,—as a direct result of Dr. Jenner's skillful and scientific study of a bovine disease,—the greatest boon that medical inquiry has ever conferred upon man. The modern investigations concerning the "murrains," have finally classified them into groups of maladies that are almost entirely analogous to the most destructive epidemic and infectious diseases of the human family; and the scientific medical study of each group of them and of the outbreaks of them during the last fifteen or twenty years, has greatly aided the progress of a kind of practical knowledge that is much needed.

* METROPOLITAN BOARD OF HEALTH, }
NEW YORK, August 13th, 1868. }

In view of the rapid spread of the malignant disease that has burst forth among herds of cattle in certain portions of Illinois and Indiana, whence beef is supplied to the Metropolitan District of New York, and the most populous portions of the Eastern and Middle States, this Board of Health has endeavored promptly to do whatever lies in its power to prevent the introduction of such cattle, and to exclude all such beef from the markets in this District. And however greatly it is regretted that farmers and the holders of the infected and sickly herds must suffer personal losses and inconvenience, the act of bringing forward and offering any such animals for food must be regarded as a very gross offence against the lives of our fellow beings. The investigations made by scientific and experienced officers of this Board have fully confirmed the opinion that the flesh of those diseased animals cannot safely be used for food. The information now before us clearly shows that until some proof of the contrary is obtained, the malignant disease which has been brought eastward from Illinois and Indiana should be regarded and treated as an infective fever or plague. The transportation of any sick or infected cattle from the sickly districts to other States should be prohibited. The offering of any such diseased animals, or any portion of their flesh for sale for food within the Metropolitan District of New York, will be regarded as a culpable offence against the sanitary ordinances relating to markets and food articles, and will be punished with the heaviest penalties the laws provide. No relaxation of this order of the Board can be allowed.

From the first hour that any officer of this Board had any information of the probable presence or approach of the infected herds near to New York, the utmost vigilance has been resorted to for the prompt and absolute exclusion of these cattle and every portion of their flesh from the markets. The greatest diligence and all available means are being employed in the investigations of the pathology and character of the disease, and its morbid results in the organs and flesh of the sick cattle.

But, until the scientific commission which was appointed to investigate the rinderpest in England had completed their reports, there had but little been published in the English language that was adapted to aid sanitary officers in meeting the exigencies of an outbreak of a destructive epizootic affecting the meat-supply of cities. The elaborate and thoroughly practical presentation of the whole subject of diseased meat-supplies, however, had previously been made, as just mentioned, by the chief medical officer to the English Privy Council; and that presentation was made solely upon the ground of the particular necessity for carefully guarding our markets and the peoples' tables against diseased meat-supplies.

Epizootic diseases, when of a pestilential or destructive character, usually make their outbreaks with great violence and rapidity of movement. And, as we are informed, there never has been an instance, until the present year, except under an Imperial government—occasionally, as in France in 1865-66—in which an infectious epizootic among beef cattle has been confronted from the first day of discovering its presence, and, so far as human ability and effort are concerned, held under absolute police control. The fact that this Texas cattle fever did not turn out to be so inevitably contagious, as there was reason to expect and fear it might, did not diminish the duty of promptitude of official action. Indeed, it has resulted that this mode of action was essentially requisite as a means of investigating the disease with accuracy and success. This remark brings us to the postulate that should be laid down as the first rule to be established in attempting to exercise a sanitary control over, or to make an accurate and scientific investigation of any infectious and pestilential disease of cattle, sheep or swine that are designed for human food. It is as follows: Place every diseased animal in quarantine, and have all infected and suspected animals under strict observation and under sanitary regulations, wherever they are moved or kept.

Hitherto, or especially until the European States brought the rinderpest under scientific investigation and strict police control, there has been much difficulty in pursuing medical observations upon the pestilential diseases of cattle. On the one hand, it has been difficult—in the United States, scarcely possible—for medical officers of health to pursue any adequate study of a bovine epizootic. And, on the other hand, the descriptions and the pathological inquiries concerning epizootic maladies were generally vague and unscientific.

The fact was known to us that there was such a malady as the "Texas Cattle Disease," or "Spanish fever," but no medical or scientific account of it had ever been published. It was also obscurely known that when improved Northern stocks of cattle (and horses also) are taken into the regions of the Gulf of Mexico, they suffer an enormous death-rate from some unknown and undescribed disease. This obscure kind of knowledge had, for the past ten or twelve years, been so vaguely reported, that really nothing was known of its medical history. The writer now recalls with

much interest certain efforts he made, when passing from St. Louis to New Orleans, in the summer of 1865, in company with two gentlemen from the western border of Missouri and Arkansas, to ascertain what were the geographical limits of the "Texas Cattle Disease," or "Spanish fever," of which some indefinite kind of information had been received from southwestern Missouri before the war. But the war had suspended the disease, and it was only remembered as a "dry murrain" that destroyed native herds at the fords of the Osage river. The information that during the last few months has reached us concerning the earlier observations of this disease, proves that it had for many years been vaguely known and described by the great drovers of cattle in the Southwest. We here allude to these facts for the purpose of showing that it was not possible, at the time when we first saw the disease, to refer to any published account concerning it, that could in the least aid the sanitary authorities in the duties which they owed to the public, in regard to measures that might need to be taken concerning the infected cattle. The chief objects and methods for scientific investigations by the Board's officers, had to be determined upon from the stand-point at which the diseased cattle were first viewed in the market-yards near New York, last August.

THE OBJECTS AND METHODS OF THE SCIENTIFIC INQUIRY.

Having reason to believe that this disease was allied to the anthracoid maladies, or to some specific and infectious pestilence, which, by exact methods of investigation, might be as perfectly understood as any great types of disease can be, and, believing also that whatever we might clearly demonstrate in regard to the origin, spread, and morbid changes, or pathology of this cattle fever, would directly promote the knowledge of causation, and the means of preventing epidemic as well as epizootic diseases, we adopted impromptu the methods of inquiry that are indicated by the present advanced state of medical and sanitary science. These comprised:

1. The medical observation of symptoms.
2. The slaughter and post-mortem examination of infected cattle with special reference to investigation concerning the disease.
3. The continual use of the microscope in the pathological researches.
4. The employment of chemical analyses and tests.
5. Experiments to test the supposed methods by which the disease may be communicated.
6. Experiments and tests for the verification or settlement of questions arising in the progress of investigations.

With this simple plan of procedure, it was easy to keep up systematic inquiries. And it has turned out, in our experience, that this methodical organization of the means for investigation has proved to be an essential aid to the work.

The objects that most urgently invited the diligent investigation by these

and other kinds of inquiry concerning the nature of the disease, after the food-question had received adequate care, are objects towards which the desires and highest endeavors of physicians and hygienists may justly be directed; for, they relate to the larger and more exact comprehension of the physical circumstances and laws that are concerned in the cause and spread of pestilential diseases.

Here was a bovine pestilence that appeared to infect nearly all the cattle that grazed over the trail of freshly arrived Texas herds, and which destroys eighty per cent. of all the Northern cattle that have become obviously infected. And yet, notwithstanding this fatality of the unseen contagium, the contagiousness itself is subject to such contingencies and exceptions, that it the more strongly promised to aid in unveiling very important truths relating to the origin and propagation of certain pestilences that afflict the human family within limited districts. Yellow fever, cholera and typhoid fever variously represent the kinds of contagia and classes of yet undiscovered material causes which need, if possible, to be individually described, so that the hygienic control of them may be more definite and absolute. And, as regards a remarkable association of analogies that we have found to exist between the Texas Cattle Disease and the yellow fever, as witnessed in the human family, it may be remarked that we are now fully warranted in adopting the expression used by Dr. Stiles in his report, that the "Texas cattle disease, when judged by its pathological lesions, might be termed the yellow fever of cattle." A detailed account of these analogies need not be presented here, but it suffices to state that the points in comparison in these two pestilences are so well marked, as to warrant the belief that the actual demonstration of the precise nature, origin, propagation and pathological effects of the infective principle or virus of either of these two pestilences, would throw such a flood of light upon that of the other as to enable medical men soon to grasp and unfold the hitherto mysterious laws that govern the propagation of yellow fever. Let it be understood, however, that we do not presume that these two pestilences are *identical*; we simply assert that they are wonderfully analagous in essential and constant attributes in their pathology, and in certain chief points, but not in all, of the phenomena and habits of their respective principles or agents of infectiveness.

Upon this subject the leading medical philosophers and hygienists of our day, have for some years past been urging the necessity and duty of making careful and thorough scientific investigations in regard to the infectious maladies which afflict cattle, sheep and other domestic animals. It requires no argument to show that both the labor and facilities, as well as the satisfaction, in making exact observations upon tame animals that are wholly under the control of the medical observer and subject in all respects to his absolute authority, even to any kind of experimentation (experiments that are, of course, *not cruel or barbarous*), and subject, at the observer's arbitrary decision,—to slaughter and to the instant examination of the blood and the tissue while they are absolutely fresh,—are conducive to the attain-

ment of exact and trustworthy results, and to the discovery of the more important and recondite physical relations that most need to be understood in the history of infectious and epidemic or endemic diseases.

Epizootics, thoroughly investigated in the light of modern science, can become, and indeed are becoming the most trustworthy aids to the correct interpretation of the conditions and principles connected with the propagation and the pathological history of pestilential epidemics. The time has come when the medical profession is demanding that the value of this kind of investigation into the pestilential maladies of the domesticated lower animals shall be more intelligently appreciated by all educated physicians who have opportunity for observing epizootics. And we deem it due to the medical profession to state in this place that not a few of its most learned and practical members are at present pursuing this kind of study in various parts of Europe, and that for several years past the profound sanitary scholar and statesmanlike medical officer of the English privy council, John Simon, Esq., has continued to direct various investigations of this kind in the interests of the public health in Great Britain. In those inquiries the name of Professor Gamgee and the distinguished Dr. Thudichum have become associated with that of Dr. Simon. Dr. Lethby—the chief medical officer of health for London—and Dr. Henry Ballard, the medical officer of Islington (a district of London famous for stables and fevers), have done much to advance this kind of investigation. In connection with the English Cattle Plague Commission we find that the chief value of all their royal reports consists in the results of scientific investigations by Dr. Charles Murcheson, Dr. J. Burdon Sanderson, Dr. W. Marcet, Dr. J. S. Bristowe, Dr. Lionel S. Beale and Dr. Angus Smith; while the Edinburgh committee for the same investigation consisted of such physicians as Dr. Littlejohn, the chief medical officer of Edinburgh, Sir James Y. Simpson, Dr. Lyon Playfair and Dr. Andrew Wood. These distinguished names represent the highest renown and scientific ability of the medical profession in Great Britain. In this list of the promoters of the kind of inquiry here referred to, we find the names of Sir Henry Holland and Dr. Wm. Budd. The Royal Academy of Medicine in Belgium, has for years made it a point of duty to promote this kind of scientific investigation; and throughout Europe this class of inquiries is regarded as eminently dutiful by medical men and by governments. But to the Metropolitan Board of Health and the Cattle Plague Commissioners it is not necessary to mention this testimony to the correctness of the principles on which they have acted in their official efforts to procure a suitable investigation of the Texas Cattle Disease. The subject is here referred to in this way for the purpose of promoting this kind of practical inquiry into the nature, causes and means of preventing both epizootic and epidemic diseases. If there are among us any persons within the ranks of the medical profession or in public life who would affect to disdain such labors by medical or other scientific men, it would be a waste of time to offer evidence to them

in support of the course pursued by the Board of Health and the State Commissioners.

But to return to the ground upon which the lines of progress in the needed advancement in medical and sanitary knowledge are now marked out, it is deemed desirable that the medical officers and members of the Board should put forth reasonable endeavors to promote the advancement of these topics of inquiry. The committee, and the medical officers of health in various cities, with whom we are now in correspondence throughout the United States and Europe, entertain the same opinion upon this subject, which has been well expressed by Dr. William Budd, of England, in his admirable sketches of the epidemic variola ovina, or small-pox of sheep. That greatly honored physician and hygienist, in the annual address which he delivered by appointment before the British Medical Association, set forth the views of the enlightened portion of the medical profession, as follows :

Statistics afford much information on epidemics ; but it is all of a general kind. The really vital questions they leave almost untouched. Neither on the mode of being of the morbid agent without the body, nor of its mode of action, do they throw any but a dim and distant light.

What we want is some clue, however slender, to guide us through the obscurity in which the truth lies hid. Now, exactly such a clue is found in that most remarkable of properties, the power which certain epidemic disorders possess of spreading by contagion. If we were asked to define what other conditions we would desire it would be that all the sufferers should be under our own eye, that their incomings and outgoings and intercourse with one another should all be known to us ; or, better still, should be determined by our own will. It will be seen at once, that taken together, these conditions are not to be met with in human life. They are only to be found in the case of the domestic animals.

What in the whole range of medicine is so striking as this invasion of the yet living and unbroken frame by a power, which, like an evil spirit of the olden time, unseen, untraceable and unbidden, enters in and takes possession, and holds riot and revels there, to issue forth again reinforced by a countless progeny ? What so wonderful as this *imperium in imperio*, in which the majestic spirit that animates the human form is dethroned, and the noble form itself is often marred and laid in the dust, by a thing in comparison with which mildew and toadstool stand high in the scale of being.*

These are the thoughts of no ordinary physician, but of one of the greatest promoters of hygiene that ever lived ; and these words were spoken to the chief leaders of medical and sanitary science and practice in England. In their endeavor to grasp the causes and the secret operations of human diseases, especially those of an epidemic and infectious type, physicians and hygienists are continually thwarted or hindered by the

* *Variola Ovina, Sheep's Small-pox, or Laws of Epidemics, illustrated by an experimental type.* Being the annual address before the British Medical Association, 1863. By William Budd, M. D., Hon. and Consulting Physician to the Royal Infirmary, Bristol.

various circumstances which are peculiar to the social, moral and physical conditions that are characteristic of man, and of the very organization of society. For when we would undertake any exact demonstrations regarding the incubation or the exclusive operation of any contagium or infection in man, there arises the necessity and the difficulty of an arbitrary control of all the movements of the persons who become the subjects of such investigation. And then, even under imprisonment, the human being is sure to interfere in some way with the plans and details of the medical observations. So, likewise, the most favorable and essential physical circumstances for insuring correctness and completeness in the investigation of the anatomical and pathological changes that constitute or cause the disease, especially in maladies of the infectious and epidemic types, the *post-mortem examination* is necessarily delayed in obedience to the sentiment of proper respect for the dead and for the grief of the friends; and in cases of convalescence, or partial recovery, or on the other hand, of lingering suffering and the slow approach to the fatal end, the way is necessarily barred against the discovery of the most essential facts that need to be understood by the physician and pathologist; the very sentiments and sanctions of our moral nature forbid that we should so mar the human body, or proceed upon any investigations upon or with it, as in any manner would disturb the living occupant, or in any manner offend the sentiments of the living friends after death shall have left to scientific investigators the human body slain by the disease that is the subject of the desired inquiry.

But, in addition to all these obstructions to the prompt and exact researches in the pathology of diseases of the infectious and epidemic kinds, there is an insurmountable difficulty in regard to the exigencies, perils and alarms which always attend upon such maladies in the human family, when the claims of the sick and the dying demand the utmost sacrifices of the physicians' time and thoughts, and when, alas, the healer and student fall victims to the fatal infection of the malady which demands such sacrifices for science and its humane purposes. This view of the subject in question would seem to need no special illustrations beyond this mere statement of the case; but if any one chancos to regard this as an over-statement of the case, let him revert to the experience of medical men in any great epidemic, even when not personally contagious, as in the visitations of yellow fever, a pestilence that like cholera, calls urgently for the most searching investigations. Even upon the inviting and airy grounds of the Quarantine establishment, in successive years, the present Registrar of the Metropolitan Board of Health, then in charge of the Quarantine hospitals, found that out of the great number of scientific physicians whom he invited to witness the phenomena and pathological effects of yellow fever, only two ventured to approach the hospital wards or enter the dead house.

The remark has justly been made by our excellent pathologist and microscopist, Dr. Stiles, in his special report, that the Texas Cattle Disease

may properly be termed *yellow fever in cattle*. And, although it is not claimed that the cause of the Texas Cattle Disease and the mysterious contagium of the yellow fever in man are one and the same, yet it is a fact full of practical importance and significance that this disease of cattle is the only one yet discovered and examined in the animal kingdom which produces identically the same pathological changes and all the essential phenomena that are found to characterize yellow fever in man. The writer speaks from very extensive observation and researches in each of these diseases when he states that the remark made by Dr. Stiles, is, in his judgment, fully sustained by the constant attributes of both the diseases, and that it now seems probable that the medical profession will ultimately arrive at an exact and controlling knowledge of the great scourge of our American tropics and littoral regions by pursuing the same course of investigation in regard to it that we have pursued in regard to the Texas Cattle Disease; and it is not altogether improbable that the very lines of researches which have now been commenced so successfully in regard to the cattle disease may lead directly to the much desired discovery of the essential nature, operation, cause and external sources of yellow fever. The medical officer to whom the supervision of all these researches was committed, confessed at an early stage of the work, even before the end of August, the wonderful analogies which he and Dr. Stiles observed to exist between these two diseases, as respects changes, tissues and fluids of the victims, as well as in regard to some points connected with the incubation and effects of the infectious cause; so that the hope of being guided by this bovine pestilence back through its own natural history and upwards to a true knowledge of the exact sources and the nature of yellow fever and some other destructive pestilences, should inspire untiring endeavors to reach general results that will permanently benefit mankind after this new disease of cattle may have become extinct under improved sanitary care in the herding and handling of Western and Southern stock. The very direct bearing which this kind of investigation is to have upon sanitary science and the application of preventive measures against the worst pestilences that have, until the present hour, continued to afflict the human family, will ere long be well understood. Then will these labors which the Metropolitan Board of Health authorized its medical officers to undertake, be fully appreciated.

THE MEDICAL OBSERVATION OF THE SYMPTOMS IN THE "TEXAS CATTLE DISEASE."

The minute observation of symptoms in wild and restless bullocks that chiefly suffered the disease, was a difficult, and sometimes an impossible task. We have requested Dr. Morris to incorporate into his special report, all the tabulated records which the committee has been able to make upon this subject. It will be seen, by Dr. Morris' report, that the symptoms cover a diversity of facts,—the chief of which relate to the temperature, condition of the respiration and the respiratory organs, the pulse and the excremental

performances, especially the hæmaturia or "black water." The leading facts regarding the symptoms that deserved most attention from the medical observer are these, viz: (1.) A great increase of temperature, which is invariably noticeable at the earliest moment of *obvious* disease. Though no opportunity was afforded this committee, or Assistant Commissioner Dr. Morris, to make observations for four or five days previously to the commencement of the obvious symptoms in any infected bullock, there was no instance in which an observation of increased temperature amounting to $3\frac{1}{2}^{\circ}$ above the natural heat of healthy bullocks—that standard being 100° Fah., or a fraction of a degree below 100° —was not followed within four days by the unequivocal evidences of the cattle disease. The first observations upon this point were commenced on the 8th and 9th of August, in Mr. Alexander's infected herd at Communipaw, and on the 11th and 12th, temperature observations were made upon five of the cattle that exhibited symptoms of the disease in Mr. Thomas' herd at Bergen, with the following result: The one least sick in appearance had a temperature of 104° , while one that was staggering and delirious with the disease had a temperature of 109° ; another, delirious but not staggering, $107\frac{1}{2}^{\circ}$; another, $107\frac{1}{2}^{\circ}$; and another, very feeble, 105° . On the 13th of August, the animal that was delirious and staggering twenty-four hours previously, and now unable to walk, had a temperature of 106° in the rectum, and $106\frac{1}{2}$ in the blood of the aorta at the moment of slaughter. The other bullock that had a temperature of $107\frac{1}{2}^{\circ}$, was found in a dying condition on the 13th, and had a moment before slaughter, had a temperature of 107° in the rectum, and $107\frac{1}{2}^{\circ}$ in the blood of the aorta at the time of slaughter; while the bullock which on the 12th, had a temperature of 105° , was found to be in a dying condition, and had a temperature of 106° in the rectum and the blood of the aorta at the moment the vessels of its neck were severed.

Persons who did not witness the disease might reasonably inquire if this feverish temperature was not the result of inflammatory action or excessive irritation incident to the hardships of transportation; and this was a question which the committee caused to be thoroughly investigated, with reference to cattle that were arriving under the circumstances, and at the same time obtained in reference to the sick herds. It was proved that the temperature of all cattle, excepting the victims of this infection, gave evidence of but slight increase of temperature under any circumstances, and that an increase above 103° Fahrenheit was not observed in any other than infected bullocks, and that there were only three or four instances in which the uninfected animals steadily exhibited a temperature above 101° . The average of all the temperature observations taken of the infected bullocks was nearly 105° . The mean temperature of the central part of the liver, taken from ten to fifteen minutes after the animal ceased to breathe, was $104\frac{1}{2}^{\circ}$.*

* The practical utility of thermometrical observations has been strikingly illustrated in the dealings which the sanitary officers have had with cases of the Texas cattle fever. The pestilential type of this fever was unequivocally asserted by this test alone, even in cases in which the obvious symptoms had not yet appeared.

(2.) Evidences of toxæmia were early observed to be among the very first symptoms of the obvious stage of the disease—constant unrest, a faltering gait, a partial paralysis, occasionally a kind of paraplegia; the sick animal in such cases reeling or actually falling down upon his hind quarters, and in some instances the urinary bladder remains distended and almost continually leaking, as by a kind of enuresis—the symptoms in short being those which pertain to failure of innervation in consequence of some kind of poisoning, or from some fatal change in the condition and chemistry of the blood. But chief among this group of symptoms is the disturbance of the senses, and the occurrence of a kind of delirium.

Further details of this class of symptoms need not be mentioned here. The evidence of the operation of a morbid poison is the subject to which attention is invited; and, whether this poison be derived from an external source, as some kind of contagious matter, for example, or some parasite, or whether it chances to be a production of morbid changes in the proximate elements of the circulating blood, the fact that such a condition of empoisonment occurs is important and suggestive.

(3.) The evidence of dissolution of the proximate elements of the blood appeared in a special group of symptoms as well as in certain general phenomena. The "black water," or hæmaturia, is the constant symptom of the breaking up of the blood globules, while the marvelous increase of temperature in the infected animal, the ecchymoses and engorgement of nearly all vascular organs and tissues, such as appeared in nearly all the cattle that died or were condemned, must be regarded as *general* symptoms. The bare fact that a destructive disorganization of the blood was not only the invariable result in all the cattle that died or were slaughtered in consequence of the malady, but that wherever the infection was introduced among herds, the farmers and common observers recognized the disease by the term "black water," or "bloody water," shows how invariable was this pathological change.

To ascertain the causes and the history of these destructive changes in the blood would be almost equivalent to gaining access to the entire line of the facts which are contained in the causation of the disease. Hence the class of symptoms here mentioned, together with the minute and general changes which the tissues of the infected animal suffered in consequence of the changes in the blood, and especially certain morbid conditions of the liver, the bile and the spleen, that would morbidly affect the blood, became the objects of especial study. The researches of the microscopist and the chemist were of the highest service here. And there is reason to believe that the very discriminating study which these scientific experts bestowed upon the questions that were submitted to them in regard to the physiological and chemical events concerned in the spoliation of the blood, will be among the most permanently useful labors of the whole investigation. The symptoms and phenomena that indicated these destructive alterations in the blood were worthy of the distinguishing importance that has been attached to them both by the herdmen and medical men.

(4.) The careful examination of the flesh and all the organs of beeves that came under our suspicion in various abattoirs, with regard to the healthful conditions that might be discovered in such meats. This *post-mortem* observation very frequently was resorted to by Sanitary Inspector Morris, as a means of verifying or of correcting opinions or suspicions that were based upon slight or equivocal symptoms in the living cattle, or upon equivocal records of the herds. As will be seen in Dr. Morris' special report, there were numerous instances in which the opportunity for the observation and testing of symptoms in living cattle that were under contract by butchers, was so unsatisfactory, that the post-mortem observation of the carcass and its viscera was deemed important. The fact should be stated here, that these post-mortem observations—and we now refer to the mere *inspection* of the carcass and the abdominal viscera—so completely confirmed the trustworthiness of the thermometrical observations and the special symptoms of the advanced or obvious stage of the disease, that Dr. Morris finally relied exclusively upon the self-registering rectum thermometer and his own personal inspection, during the most trying periods of his service as Assistant Commissioner for the State. When it is considered that the latent or incubative period of the disease is protracted through several weeks—always more than fourteen days—and that the temperature test was never resorted to in vain when a doubt existed, and that the post-mortem inspection of several thousand beeves, by Assistant Commissioner Morris and his aids, lent full confirmation to the conclusion that increased temperature was the first, most constant and sure of all means for ascertaining the existence of the disease at any stage in which its presence and effects can in any manner be ascertained, the importance of the records of the temperature will be conceded.

(5.) Lastly, the observation of the symptoms of recovery or convalescence became important in the study of the disease. The opportunities for such observations were rare indeed. The five sick bullocks that were given up to us by Mr. J. T. Alexander, for observations and medical experimentation, as well as for ultimate anatomical examination, were too wild and timid to allow of satisfactory observation of the temperature and other intimate symptoms daily. Greatly as this circumstance was regretted, in these most instructive cases, the general observations upon the progress of those cattle towards recovery, will be perused with interest. They are recorded in Dr. Morris' contribution to this report. It will be noticed that the temperature of the first of that group of convalescents, at the date of his slaughter and on the seventh day of convalescence, was $103\frac{1}{2}^{\circ}$ Fah. This is precisely 3° less than the temperature observed in the same bullock one week previously, when he was passing bloody urine and exhibiting all the symptoms of the advanced or obvious stage of the disease.

Though the five infected bullocks here mentioned constituted the only group of convalescent cattle without any further signs of disease were observed throughout the entire period of recovery, the commencement of symptoms of recovery until the end of the period were numer-

ous instances (in all about thirty cases) in which bullocks were brought under Commissioner Morris' official observation, when in some stage of partial recovery that had become seriously complicated by excessive or incurable lesions, or by fever and fatal prostration, in consequence of the severities of hurried transportation. If the medical reader of this report will turn to Prof. Chandler's tabulated analyses of the blood of some of these convalescents, the state of the blood in the instances here referred to will be seen to account for the fatal results which ensued in convalescent cattle when subjected to the hardships of transportation or to dry food, etc.

We have referred to the recovery of five cattle under very favorable hygienic care and antiseptic medical treatment at Communipaw. And it is proper that we should express the conviction we entertain that every one of them would have died in a very few days if they had been driven to the butchery sheds in the heart of the city and there put upon hay diet and hard usage. We beg leave here to append the latest statement from Dr. Snow, superintendent of health in Providence, concerning the ultimate result of his observations in the case of the convalescent and imperfectly cured bullocks that were under his official direction, and concerning which we have given some account in a preceding section of this report. The group here referred to fell sick on arriving at Providence, the first week in August, and the owners promised the medical officer that he should see the survivors at slaughter, some time in December, if they recovered flesh by that time, as they had no doubt they would before the expiration of five months. As Christmas week was the time designated for the slaughter and examination, we have waited until the printing of this report has been commenced. Under date of January 7th, 1869, Dr. Snow writes :

* * * In relation to those cattle which were sick last summer, I am informed that *they have not grown fat, and are unfit for beef*. It is, therefore, yet uncertain when they will be killed. The promise is continued, and I presume will be remembered, that when it is proposed to kill them, I shall have due notice and opportunity to examine them.

It will be seen from these records relating to medical observations upon convalescent cattle in this disease, that like all other observers of the malady, the assistants of this committee came well nigh losing all opportunity of studying the phenomena and history of convalescence. Fortunately we had some rare chances for this class of observations, and they were improved. But had it not been for the unceasing watchfulness of Assistant Commissioner Morris, who permitted no suspected bullock to escape his personal inspection, and the test for the temperature and other symptoms, some of the most instructive illustrations of the disease would have remained unobserved and unrecorded. The explosive suddenness with which the fatal stage of the disease occurs, the rapidity and brevity of that stage, and the readiness with which the dying animals could be, and for a time were, sequestered, or abandoned unclaimed, and—most important of

all—the rapidity of the putrefaction that immediately ensued upon the death of the deceased bullocks, rendered it a difficult and vexatious task to carry out the plan of searching investigation we had adopted. Distance, weariness, hunger, storms, the rapid transportation, and the quick assembling of all the necessary assistants in each post-mortem examination, were very essential means to the successful results that attended these efforts.

Such has been the history of our efforts to secure a reliable series of medical observations upon the Texas Cattle Disease. These efforts were necessarily made under circumstances of very great inconvenience, in open yards or pastures, upon wild and timid bullocks, with no skilled aids to trust, except the few overworked medical officers whom we have here mentioned, and with only an occasional opportunity to continue the observations for more than thirty-six hours in any one case—so rapidly fatal was the malady in its stage of obvious symptoms. Imperfect and incomplete as the series of observations continued to be, untiring endeavors continued to be put forth to correctly observe the essential symptoms of the disease in each group of infected cattle that came within reach of the medical officers who had undertaken this inquiry; and it was by persistent and unvarying adherence to the original purpose and plan of the observations that anything worth having was ultimately accomplished. The total results of the medical observations may, therefore, be summed up as follows:

(a.) The duration of the period of obvious symptoms of the disease is brief, and so far as our observations and other researches can be said to have determined anything in regard to the onset and progress of this short and last stage of the malady, it seems not only to be a paroxysmal stage or period of the disease, but likewise seems to be a *single paroxysm*. That is, the Texas cattle disease, considered with reference to its *obvious symptoms*, is a fever of *but one paroxysm*.*

(b.) The symptoms come on, at first, in so sudden and violent a manner as to have led to the remark in every group of cases we have witnessed in Northern (native) cattle, that the *obvious* manifestation of the malady comes, as the French say, "*par explosion*," or with suddenness and violence.

(c.) The symptoms, as well as the observations that have been made in the numerous post-mortem examinations at all stages of the disease, plainly declare the fact that the destructive or disorganizing changes which occur in the proximate elements of the blood, and in the special degenerations of tissue in the liver and spleen are *very rapidly produced*, and that the logical evidence is clearly in favor of the hypothesis that the structural lesions which ensue in this malady mainly occur during the obvious brief period of symptoms. But the symptoms do not yet reveal the extent of the congestive and other changes that may be going on in the liver, stomach, spleen and kidneys for weeks previous to the explosive or phenomenal and obvious stage of the fever. Such morbid conditions are reasonably inferred by other than symptomatic evidence.

(d.) The symptoms connected with the appearance, posture, respiration, pulse, successive changes in the progress of the fatal or obvious stage of the disease, as all that is indicated by the temperature changes, and by the phenomena attending the death of the infected cattle, completely harmonize in the conclusion that all these symptomatic conditions indicate the rapid and fatal operation of a morbid poison, or a combination of poisonous agents. And further, it is demonstrably certain that the invasion of the blood and tissues by that poisonous agency is rapid, and comparatively, that it is sudden; or, that the powers of life do succumb to its morbid power very rapidly and suddenly. So clearly was this fact indicated in our earlier observation of the symptoms and phenomena of the disease, that it led to very scrutinizing search for the morbid *cause* by means of the microscope and chemistry. In other words, the symptoms guided and impelled us to those exact researches which were subsequently made in regard to the pathology and causes of the disease. This has been, therefore, a strictly medical and logical kind of investigation, from first to last.

THE SLAUGHTER AND POST-MORTEM EXAMINATION OF INFECTED CATTLE.

This duty was deliberately undertaken, as was noticed in the first section of this report, as soon as permission was obtained. The task was, in all cases, an unpleasant, toilsome and expensive one. It was not a self-imposed task, for it was a *duty*.

Familiar with the history and requirements of the more exact methods of pathological and medical investigation, the Sanitary Committee and Medical Officers of the Board of Health foresaw many difficulties which they had reason to fear might prevent success in the effort to push such investigations as were essential. 1st. The suddenness of each discovery of the sick bullocks by the Sanitary Inspector and State Commissioner at the herd-yards, and the rapidity with which the fatal stage of the disease ensued, rendered it difficult to make arrangements for a post-mortem in season to find the animal alive at a suitable hour for the inspection. 2d. It was deemed essential that everything pertaining to the post-mortem investigations should be attended to immediately after killing the diseased animal, and this involved great sacrifices of time and convenience, besides much cost and vexation. 3d. It would almost certainly be found impossible to make perfect work in all the needed branches of investigation, and some points would necessarily be omitted.

The importance of the researches seemed to justify the attempt then, and as the medical members of the Board that constituted the Sanitary Committee advised the effort to be made, the duty was plain. But in present-

* The medical reader of this report need not be reminded that this peculiarity in the type and phenomena of the Texas Cattle Disease renders it strikingly analagous to yellow fever in man. And it should here be remarked that the observations of Dr. Rauch and Mannheimer, in the infected cows at Chicago, establish the fact that the *obvious* or last stage of the disease is ushered in by a *chill*.

the effort, it is due to all concerned that the fact that the ability or means for prosecuting all this was dependent upon the voluntary labor and sacrifices by two or three persons, and greatly desired to see the whole work and responsibility placed in other hands. From beginning to end this class of investigation required infinite toil, patience and rigid regulations for its execution. The sketches which have been prepared in chromo-lithography, and explain this report upon the disease, have been executed with great carefulness. They are especially valuable as showing precisely how lesions occur, and by what distinctive marks and colors they are distinguished at the hour of the slaughter and death of the sick animals.

In the selection of examples for these sketches of the pathological changes in the disease, there was a careful avoidance of all exaggerated or excessive alterations. It was deemed useless to attempt to sketch exaggerated illustrations, any of the excessively marked results of the disease. For example, the case in which the kidneys had become disorganized, or the spleen had become a mass of diffuent pulp, or, as was occasionally observed while the bullock yet lived, the tissues being inflated by the gases of putrescence and decomposition. The sketches relate solely to the average classes of cases of the disease. They were all animals in good health and full development, excepting only a few convalescents that were, of course, emaciated by the continuance of the disease.

The first fact that impressed the medical officers concerning the morbid changes produced by the disease was, that the putrefactive process was in full operation almost immediately after death, whether the death was by the axe and knife, or by natural exhaustion. It was all-important, therefore, that whatever post-mortem investigations were made, should be confined to slaughtered bullocks, and instantly after life had ceased. That this tendency to speedy decomposition was not due to peculiarities of the weather, or to any other cause than disease itself, would plainly appear from the fact that the cattle, horses and other animals that daily died in the metropolis from other causes, did not undergo such rapid decomposition, nor, especially, did any of their viscera undergo such putrescent disorganization as was found to be the rule in regard to the kidneys, the spleen, the liver, and the fluid blood of the infected cattle. As mentioned elsewhere in this report, these fermentative (zymotic) changes, were, in some instances, so fully established before the dying animals had ceased to breathe, that it was found in the dissection which instantly followed the slaughter, that putrescent disorganization was already in progress in the viscera here mentioned, and that gases arising from the general decomposition, already filled the capillary spaces of the surrounding tissues.

The second very essential fact revealed in the greatly increased size

examinations
the spleen

and the kidneys, and in very important pathological alterations in the two viscera first mentioned, so important and peculiar indeed, when examined microscopically and with precision, that no ground of doubt now remains that certain of these morbid conditions may justly be regarded as trustworthy guides in discriminating between undetermined causes and kinds of disease in dead beeves inspected at abattoirs, or in cattle when found dead or brought to slaughter. Yet, this kind of pathognomonic evidence found in the liver and spleen by the microscope, is so constantly associated with several morbid changes which are visible to the naked eye and other ready aids to a judgment, that for ordinary purposes of sanitary and market inspection, the latter can always be relied upon with tolerable certainty. A summary of these conclusions upon the post-mortem inquiries will be found at the end of this chapter.

RESULTS SOUGHT BY MICROSCOPY, CHEMICAL ANALYSES, AND THE EXPERIMENTAL TESTS.

The practical usefulness of the microscope, however powerful and perfect the instruments employed in the researches of pathology, is so largely dependent upon the experience, skill and good judgment of the medical observer who uses them, that it is hardly necessary to mention the particular quality of the instrument which Dr. Stiles used in his examinations. But as we have ascertained by correspondence with several good microscopists in western cities where the disease was being observed, that it has frequently been found impracticable to bring into operation the degree of excellence and power of glasses which Dr. Stiles was employing, we will mention, in his own words, for readers who may desire to be informed on this point, that "the more delicate researches were made with a 'Hartnach immersion system,' magnifying, with No. 4 ocular, one thousand diameters."

All who witnessed Dr. Stiles' demonstrations in the field (or the abattoirs) were fully impressed with the remarkable clearness and penetration of his glasses, and with the nicety and skill of his manipulations of the elements that were brought under examination. And as the plan of the pathological researches required that all final conclusions must be based upon results of examinations made of tissues and fluids taken freshly from cattle killed and dying in presence of the medical officers directing the investigations, there is a trustworthiness in the microscopical and other pathological researches in this inquiry such as has rarely been attained. Numerous cattle that were found dead or that died in the absence of any medical observer, were examined minutely, but the conclusions in this report are based upon none of those examinations, though the latter were generally instructive and corroborative in their bearings upon the medical history of the disease.

As the microscope had, in skillful hands, during the past few years, revealed the essential character of certain morbid changes that now enable us to determine the nature and name of the fever that has destroyed the



1





Stratigraphic Column
Fig. 10







Fig. 1. Larynx and trachea.







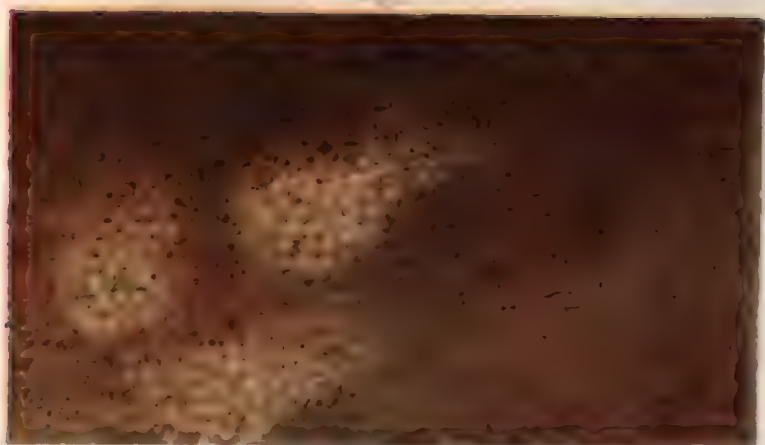






Fig. 1. *Strophomena*
specimen No. 1





Fig. 1. Liver of a dog.
Natural size.

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11

12





11

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11

11

Hudson city, N. J. It is almost the only instance in which the entire lining membrane of the rennet or fourth stomach was wholly unbroken by erosions or sloughs; yet the bullock was in a dying condition when killed. It would appear quite probable that the lesions in the fourth stomach result primarily from intense engorgement and stasis in the vascular structure of that stomach, and that this lesion occurs in the dense fibrous structure of the tubular section, where the sloughing and erosion of mucous membrane have been chiefly observed. Though the constricted or closely adherent relations of the membrane throughout the tubular or "reed" portion of the abomasum may justly be deemed a sufficient reason for its having become the seat of the only characteristic lesion in the stomachs, the normal constriction of the part rendering this mode of sloughing or breaking down of mucous membrane, when engorged with disorganized blood, a natural and certain consequence, yet it was deemed important to search diligently in that and other portions of the gastro-intestinal lining, to discover if any parasitic or fungus organism might chance to be associated with such a peculiar kind of lesion of the membrane. None was found. But, to the pathological anatomist the causes of this lesion cannot appear doubtful, particularly when it has most extensively appeared in those cases in which the structures and functions of the spleen (as the *grand diverticulum* for the excess of blood flowing to the stomach) are considered. This class of lesions in the *fourth stomach* was so constant (though greatly varied in amount) in the whole membrane of infected bullocks examined by the Board's officers—that when properly discriminated from the lesions produced by ordinary gastritis—that, as Assistant Commissioner Morris has justly remarked, "the ulcerations, or rather the peculiarities, that were found in the tubular portion of the rennet or fourth stomach, and at the base of the longitudinal folds in that stomach, finally appeared to be a surer guide to a recognition of the disease than was the mere appearance and size of the spleen or the liver; the absolute tests by the minute examination of the liver, bile and spleen-pulp by the microscopist, and the historical and symptomatic history of the animal before death, being, of course, preferred to all other kinds of evidence. Yet to the practiced eye, these ulcerations, sloughs and erosions served as trustworthy guides in deciding the nature of any case in which for the moment the other kinds of evidence were not accessible."

The plates which are given in this report, to illustrate the gastric lesions, present a fair average of them, both in regard to extent and morbid coloration, etc.

Intestinal Canal.—The lesions found in the intestinal canal were regarded as being important only as illustrating: 1st. The existence of passive engorgement in the mucous membrane at various sections, principally in the cæcal portion (plate 9, fig. 1), and in the rectum (plate 14, and plate 8, fig. 2). The mere congestion which was always found in various portions of the small intestine, seemed to be wholly unimportant,

except so far as it showed very happily the nature and universality of the capillary engorgement that occurred in the acute or last stage of the disease. Plates 14 and 15 illustrate this condition of the intestinal mucous membrane.

Constipation seemed to be the usual condition of the bowels during a number of days preceding death, in the infected cattle. The intense and deep engorgement of the rectum and the perirectal tissues in the sick animals, was a very noticeable fact. So, also, was the presence of bile in the intestinal tract in most cases, even in those that were great sufferers from constipation. The question will naturally be asked, but we cannot answer: "Why was there constipation when an ample quantity of bile was found in the intestinal canal?" But this fact may here be stated, viz: that in feeding rabbits and mice upon breads and salads saturated with the bile from these infected bees, diarrhoea was rarely produced, though such feeding, for the purpose of infecting those small animals, was in some instances continued daily for more than a week.

Condition of the Lungs and the Areolar Tissue.—The lungs were in all cases found in a healthy condition, or, at least, unaffected by the disease, except in a very small percentage of the cases in which the infected bullock had been for many hours incapable of changing his posture, when hypostatic congestion of a portion of the lungs was noticed. The question was often asked: "How is it possible that so great a degree of disintegration of the blood produces so little congestion in the lungs?" The fact is as we here state it, and until analytical chemistry had proved that the blood in the late stages of the disease is watery and thin, it certainly was difficult to comprehend the reason for what we saw. Yet the fact must be borne in mind, in regard to the type of the disease, that it is not an inflammatory malady, and is not characterized by fibrinous and plastic exudations in any tissue of the body. It is true, however, that in a few instances there existed a marked degree of infiltration of the areolar tissue with serum and the fluid resultants of blood dissolution; and in reference to this there is an important fact to be stated in another place. The occasional occurrence of interlobular emphysema, was, in all instances, observed associated with and plainly dependent upon the extrication of putrescent gases in the capillaries and the free areolar tissue. In one instance, every portion of the dying bullock's areolar tissues was thus inflated with gases. General oedema and anasarca were occasionally observed, and copious effusions also, in the more chronic cases, in which either the period of incubation had been (as we ascertained) unusually protracted, or in which there were ineffectual and lingering efforts at convalescence. The latter class of cases possess peculiar interest, and have proved wonderfully instructive as objects of pathological and hygienic study.

Special Conditions observed in the Serous and the Mucous Membranes.—The endocardial or lining membrane of the heart was found, in certain very acute cases of the disease, to be marked by minute ecchymoses, and, in two instances, the entire endocardial surface was deeply ecchymosed.

These marks of blood changes and extravasation beneath the serous linings in the heart and blood-vessels, seem to be precisely similar to those often seen in cases of yellow fever.

The pleuritic cavity rarely contained more than an ounce or two of serum, but the abdominal cavity always contained more or less, and it usually appeared to be blood-stained. Though, with the exception of two bullocks that had suffered extensive complications, resulting from extravasations into the areolar tissue pertaining to the intestines and the surrounding fat, there were no traces of inflammation of the serous, or other tissues of the peritoneal cavity, there nevertheless was usually found in that cavity a quantity of bloody serum, as just stated. This varied from a quart to more than a gallon. In numerous instances it was deeply tinged with brownish yellow, like the fat. This effused fluid possessed, in some instances, the property of spontaneous coagulation in the open air. Dr. Stiles describes some curious phenomena exhibited by the fluid, and indicating that it contained some pseudo fibrine.

The mucous membrane of the gastro-intestinal tract exhibited no chronic alterations in structure, except in the slowly convalescent or very chronically sick cattle, and in all those cases the lesions were limited to the abomasum (fourth stomach.)

The softening, the erosion, sloughing, and the blackened patches * of the mucous membrane in the abomasum, in acute cases of the disease, were plainly due to the blood changes; while on the other hand, the peculiar ulcerations and cicatrices in the tubular portion of that stomach, and occasionally at the base of the folds, indicated the fact that some of the sloughs that had occurred during the disease carried away all the tissues, quite down to the muscular structure. The latter class of lesions was found mostly in such diseased animals as were making ineffectual efforts at convalescence. Plates Nos. 3 and 21 illustrate such a case. Plate No. 22 presents the appearance seen in the first convalescent ox that was sacrificed for dissection in the reserved group of five from Mr. Alexander's herd. This animal was rapidly recovering, and had not passed "black water" for six or seven days.

The morbid appearances usually observed to exist in the intestinal mucous membrane are shown in Plates 11 and 14. The deep engorgement in the mucous membrane of the rectum, as seen in Plates 11 and 21, was occasionally wanting, though usually very marked. Indeed, the blood-stained appearance of the excremental droppings was one of the means by which the presence of infected animals was occasionally detected by Dr. Morris and his yard inspectors, so almost constantly was this symptom present in the sick cattle, before an obviously morbid condition of the animal was

* The blackened patches and puncta, when minutely examined, were found to be simply extravasated blood, rendered black by the gastric juice, the mucous membrane at those points being softened and broken. The occasional presence of genuine "black vomit" in this stomach (the abomasum or rennet), only illustrated this pathological alteration of blood and tissue in an extravagant degree.

discoverable. In only a single instance was the muscular and areolar tissue of the rectum found deeply involved in the engorgement, or in an inflammatory process; nor was the mucous membrane, colon, or any other portion of the intestinal canal, found to be sloughed or ulcerated. The fourth stomach (abomasum) alone exhibited this lesion. The only instance in which this kind of destruction of mucous membrane was not observed, was in the case represented in Plate 4. This exceptional case was plainly on the verge of extensive sloughing or erosion of the lining tissues of the abomasum, for it was already deeply ecchymotic. This was a very marked case from Farmer Thomas' herd, and was killed for dissection August 13th. The sketch was made by the artist instantly upon removal of the organ from the carcass.

The mucous membrane and all appearances of the mouth, pharynx, œsophagus and nostrils were normal, with the exception of a jaundiced hue that was noticed in some cases that had continued many days. But in acute cases, as in that from which the stomach last mentioned was taken, the mouth and lips had a clear but somewhat injected appearance. This is shown in Plate 8, Fig. 1, together with a common accidental ulcer that chanced in this case to be present.

Post-Mortem Appearances of the Brain.—In three instances the condition of the brain was carefully examined, because it was presumed that those particular cases might be found to have suffered from acute meningitis or from cerebral congestion. No trace of actual inflammation was found, but there was evidence of congestion of the cerebral vessels in two of the cases. The medulla oblongata was examined in these cases, and sufficient effusion was found in one instance to have produced morbid, nervous and muscular phenomena. Yet the observations finally led to the conclusion that all, or nearly all the delirious actions, distorted movements and postures, and comatose conditions that characterized various cases, were attributable to the toxæmia which constitutes the essential quality of the disease.

The Pathological Changes found in vital Organs which are Chiefly concerned in Depuration and Conservation of the Blood.—The importance of the blood changes was so manifest and all-pervading in the disease that it was deemed necessary to search very carefully for whatever structural alteration the liver, the kidneys and the spleen might exhibit in the various stages of the disease. The fact that the lungs presented no lesions has already been stated, and we may now refer to the three other vital organs upon which the conservation of the blood depends. And for the purposes of this report it will not be needful to encumber the record of mere observations with any statements concerning the normal structure or the functions of these organs. And in regard to the morbid histology of most minute structural changes discovered in each of these organs by means of the microscope, all the conclusions that can properly be published are presented in Dr. Stiles' report in the succeeding chapter. The statement we would here make will refer to the grouping and total quantity of results

of the morbid alterations in these organs, so far as a reasonable judgment may now be expressed concerning them.

The Liver.—Increase in weight and volume was a constant fact. Taking the normal standard of weight of the liver to be from eleven to fifteen pounds avoirdupois, the average degree of augmentation in weight was found to be equal to about thirty per cent. above the normal weight. The most excessive weight was found to be thirty-three pounds, the steer being one of medium size, estimated at a gross weight of 1,200 pounds, one of farmer Thomas' herd, killed in the moribund stage four weeks after the first exposure to the Texas infection.

The increase in the size of the liver kept pace with its increase of weight. This increase in size and weight in all cases consisted chiefly in the excessive engorgement of the portal blood-vessels, but in the cases that had been long in progress there was such a degree of fatty and "waxy" degeneration as to add largely to the volume of the organ. This was the case with the liver exhibited in Plate 17, which weighed upwards of twenty-three pounds, and was taken from a young bullock that was slaughtered in the moribund stage of the disease, and after a long continuance of it, the entire period being probably not less than forty-five days. The shape of the liver was in some instances, as in this one, distorted by rapid increase in size. There were some instances in which a waxy condition of the liver was unattended by engorgement with blood, but in no instance was the liver found in the very "dry" condition that occurs in long protracted fatal cases of yellow fever in man, though in several instances that condition was in some degree established. The later observations in autumn clearly indicated that the "waxy"* change occurred in the animals that suffered long with the disease. This was most strikingly illustrated in the ox that was killed for dissection on the 18th of October, and some of whose morbid conditions are strikingly represented in the several figures in Plate 23. This liver weighed eighteen and a half pounds, and strongly resembled the "dry" condition in persons who die after twelve or fifteen days' suffering from yellow fever.†

Before concluding these statements concerning the obvious and essential alterations found in the liver in this disease, it is necessary that we should remark that no special importance is attached to the ordinary and familiar modes of observation and description. The color and consistence of the liver were not in all cases so *obviously* changed as to attract special notice. The morbid condition of the bile, and especially, a certain quality it displayed when tested upon blood-globules,—dissolving them almost instantly, as described in the next chapter by Dr. Stiles,—rendered it very desirable

*As described by the histologists, or under microscopical observations, this alteration in structure consists in a thickening of the walls of the secreting cells of the liver.

†The chief pathological changes in this disease of cattle promise to throw so much light upon those of yellow fever that we deem it proper to call attention to such points of resemblance wherever there is an essential and characteristic alteration of structure, &c.

to have scrutinizing examinations made in regard to the intimate or integral changes that might be found in the minute organization and structure of the liver. The pathological alterations in a viscus so elaborately organized and structurally guarded as the largest and most constantly active of all the secreting organs of the animal system—the liver—may suffer grave and dangerously injurious pathological changes both in structure and function, and still retain a fair appearance upon its surface. And as regards the discoveries that Dr. Stiles has made in his researches into the morbid alterations in the liver, and incidentally, into one of the most important elements in its pathological structure, namely, the ultimate distribution or reticular structure of the biliary duct system, it plainly appears that no ordinary observations could ever have reached such definite results, or have added such welcome and very necessary facts [for guides to the proper interpretation of the nature and consequences of the malady we are here considering; and important, too, for the more exact understanding of certain most destructive human pestilences.

The morbid and morphological changes and abnormal elements discovered at the outset in the bile of the diseased cattle, served both as a guide and an incentive to patient researches and experimental tests. The next chapter will sufficiently explain the nature of this interesting line of investigations. But let it be remembered that the first fact that was demonstrated or asserted concerning the source or carrier and vehicle of the contagious cause was this, namely, that the excrement of certain Texas cattle is directly chargeable with this unfortunate evil. Hence we came to regard with interest whatever abnormal elements or properties the bile of the diseased cattle possessed, because it is a ready vehicle for carrying into the excremental droppings whatever may pertain to it. The experimental investigations in regard to the fungus organisms found in this morbid bile are still in progress. In this branch of inquiry we invited and obtained the cooperation of Prof. Ernst Hallier, of Jena. That gentleman is justly regarded as the highest living authority in experimental and analytical researches of this sort in the study and cultivation of the microscopical organism that infest plants and animals. Prof. Hallier's plan of inquiry in regard to the fungus organisms that are found in the blood and bile of the sick cattle will be found in a subsequent section of this report. Though this particularly abstruse line of inquiry has been only collateral to the first objects that were to be kept in view in the work, and though the actual relations of the fungus spores in the blood and bile may not be fully grasped in the present—merely preliminary stage of inquiry—and may not throw any light upon either the source or the essential nature of the disease, at least until naturalists shall have advanced many steps further in the study and analysis of the parasitical fungi, the demands of progressive knowledge require that whatever facts have been acquired in regard to this collateral, and probably very essential line of studies, should not be timidly withheld from publication. Therefore the committee has advised that the record of this class of observations should be embodied in this report. And

as this parasitical element of the morbid bile has become an object of special examination, we refer to it now as one of the constant elements found in the bile of the infected cattle.

The Spleen.—The most obvious of all the morbid appearances exhibited upon the mere exposure of the abdominal viscera to external inspection is that which the spleen presents in most cases of the disease. The morbid changes that occur in the essential and intimate structure of this organ seem to be equally as constant as those which occur in the liver, but, considering the comparatively subordinate functions that are required of the spleen—so far as its functions are understood—its pathological changes cannot reasonably be regarded as being so important and far-reaching in their influence, as attributes of the disease, as the structural and morphological changes in the liver seem to be. But as the grand *diverticulum* or waste gates to the portal and gastric circulation, the spleen would inevitably become engorged and swollen to abnormal dimensions, so soon as engorgements and obstructions in the circulation of blood in the liver, or the liver and the rennet stomach occurred. This is an accepted deduction in physiology, and requires no further remark in this place.

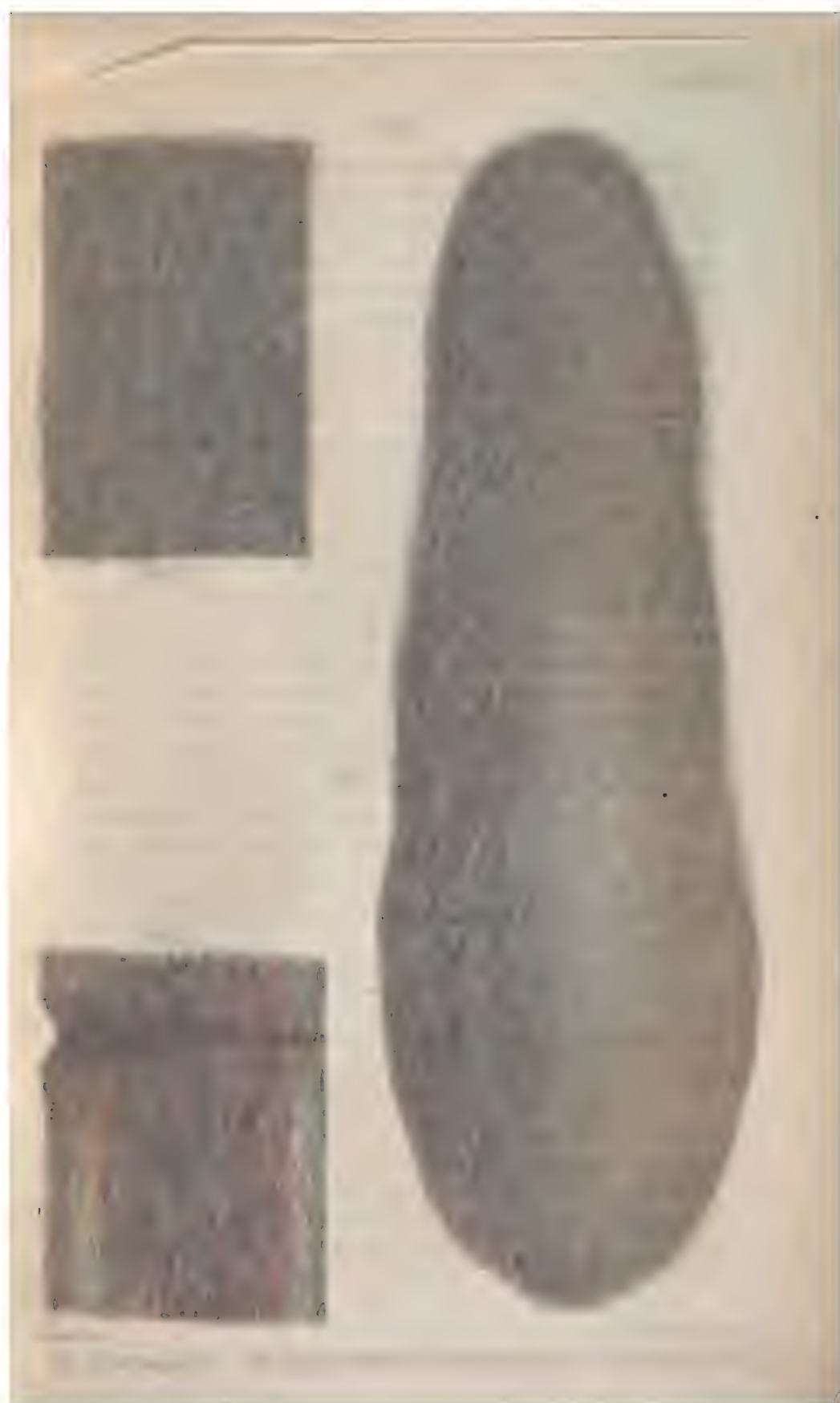
Yet it is not certain that the mechanical and anatomical disturbance which the disease produces in the spleen does not finally induce morbid conditions in it, or, as seems probable, so cripple and overwhelm its special, but obscurely known functions, that the total suspension of those functions may contribute towards the rapid and fatal dissolution of the blood itself. The fact that the spleen is generally believed by physiologists to be charged with some special duty towards the repair of the blood corpuscles, or at least, the duty of completing the normal dissolution of the defective and worn red corpuscles,* gives peculiar interest to the pathological inquiries concerning the share the spleen has in this disease. Dr. Stiles has carefully described the degenerative and other structural changes which the microscope revealed in the cases which he examined. The very constant presence of crystals of hæmatoidine in the enlarged cells of the spleen, together with the peculiar yellow flocculi, such as were found abundantly in the blood and the bile of every infected bullock must be regarded as important circumstances.

* The difficulty hitherto experienced in all efforts to demonstrate the nature and functions of the spleen and the thymus gland, need not prevent us from adopting the conclusion that notwithstanding the morbid alterations in the structure and functions of the spleen may be secondary to those in the blood and the liver, they nevertheless can contribute important results to the final fatal end. As that philosophical writer Dr. John Simon, has said of the thymus gland that "it seems to serve the purpose of a sinking fund in the interest of respiration," so it may be said of the spleen, that it serves as a sort of "sinking fund" in the interest of the worn and expiring red blood-globules, and of a sound state of the circulating blood. And continuing the figure it may reasonably be presumed that the destruction of the "fund" may, in the critical exigencies of disease, contribute to the general disaster which the blood and life itself must suffer. At any rate this illustration aptly conveys, in a homely way, a correct idea. We would invite attention to the results attained by Dr. Stiles in his study of the changes, both morbid and conservative, that occur in the spleen in this disease.

Theories regarding the relation of the spleen changes to the disease or to its fatal termination, are of minor consequence, for physiologists and pathologists will not hesitate to agree with Dr. Stiles in the very reasonable opinion, that all the essential changes in this organ of the infected animals are of a secondary character. The diseased conditions which were uniformly found in the liver and in the fourth stomach, would inevitably be attended by engorgement of the spleen.

There were four or five instances in which cattle were found dead with this disease in the Metropolitan market yards, or abandoned by the wayside, and dissected at the rendering dock, in which the spleen was said to be found ruptured. The fact is, that in every such case, this organ was also found in a state of total disintegration—a mass of diffuent pulp. Descriptions which have been forwarded to this committee of post-mortem appearances of the spleen and other viscera found in diseased cattle in various places in the Western States, show that the instances are not infrequent in which the spleen is found in the condition here described, particularly if the infected animal lingered to die in the natural way. The sanitary authorities of Chicago, Illinois, having ascertained through Dr. John H. Rauch, their intelligent sanitary superintendent and registrar, that an increased weight and volume of the spleen were the most readily observed facts to which they could officially direct the attention of butchers and meat inspectors, at the immense slaughter-pens of that city, where Texan and Western beeves are killed for packing as well as for the city stalls, ordered that all spleens should be carefully and separately weighed, and that excessive enlargement and disorganization of this organ should be regarded as sufficient evidence for the condemnation of particular cattle and herds, so as to prevent sale and slaughter. Though an engorgement and very great enlargement of the spleen may occur from various other causes than the Texas cattle infection, this test which was adopted by Dr. Rauch for convenience sake, and fully approved by Prof. Gamgee, undoubtedly served the practical purpose of the sanitary authorities of Chicago exceedingly well.

Dr. Rauch has politely furnished us a transcript of the entire record of the weights of spleens and livers that were inspected under his authority at the Chicago slaughter-pens. The record of the native cattle (Illinois and Missouri stock) shows that 4,918 were killed, and that the average weight of their spleens was 1.35 pounds each; while the record of the freshly arrived Texas cattle shows that 3,485 were slaughtered, and that the average weight of their spleens was 2.28 pounds. The details of these records show that the spleen in native bullocks rarely exceeded one and a half pounds, excepting in the case of those that were suffering from Texas Cattle Disease; also, that in the Texan cattle recently arrived there were particular herds in which nearly one-half of the bullocks had this organ so greatly enlarged that it weighed between two and a half and four pounds, or an average of nearly three pounds.



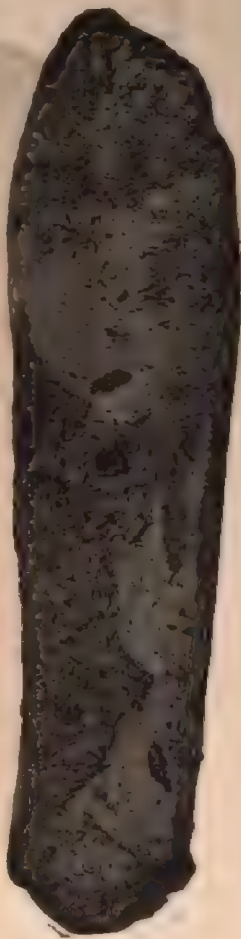
Planners projecting the volume of long-term changes in the economy, as in the long projection, are therefore considering the possibility that the postwar situation will have long-term effects on the economy which will require that all the essential changes in the shape of the economy would be a continuing situation. The demand estimates which the government has made, however, by the Board, would, however, be regarded as representative of the future.

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The Board has publicly furnished us a transcript of the entire record of the sale of spruce and fir trees that were measured under the authority of the Chicago-Longmont survey. The record of the trees within the Texas and Missouri stocks shows that 4,918 were killed, and that the average weight of these spruces was 1.16 pounds each, while the record of the freshly arrived trees on the same date is 1.45 pounds each, and that the average weight of these spruces was 1.28 pounds. The record of the record also shows that the volume of native bullheads were measured at only a half pound, as against the case of those that were collected from the Charles Deane, also that in the Texas stock record, spruce trees were particularly large in which nearly one-half of the bulls had the record as greatly reduced than it should be, even two was a half and one pound, or an average of nearly three pounds.

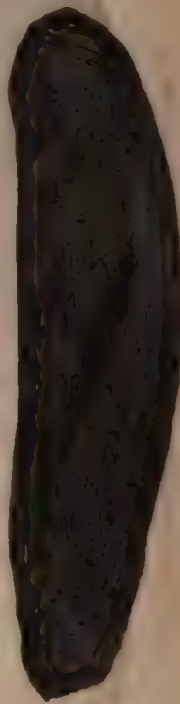
SPLEEN FROM A DISEASED TEXAN STEER,

that left Texas in June, and was slaughtered in New York in October, 1868, after feeding three months upon the farm of Mr. Alexander, in Illinois. [Gross weight of animal 800 lbs.; weight of Spleen 3 lbs. 8 oz.]



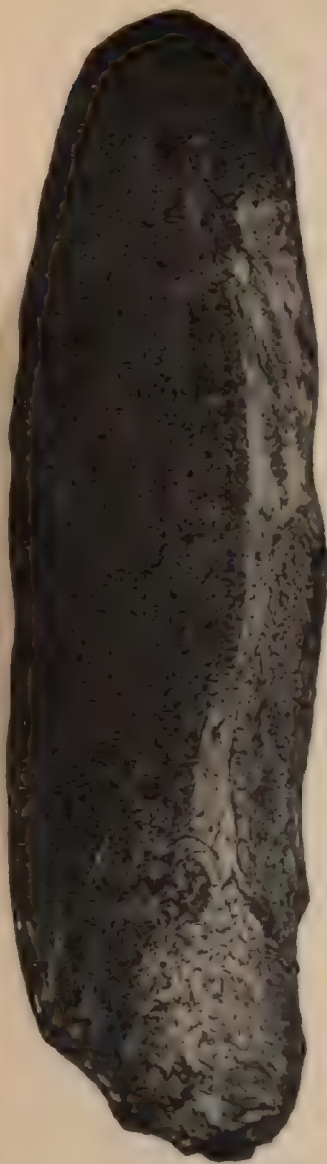
SPLEEN FROM A HEALTHY NATIVE BULLOCK,

slaughtered in New York in October, 1868. [Gross weight of animal 1,000 lbs; weight of Spleen 1 lb. 10 oz.]



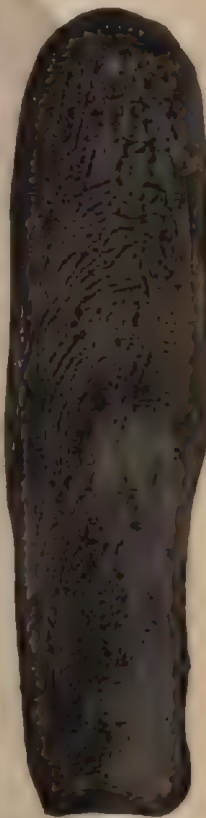
SPLEEN OF A DISEASED TEXAN,

that arrived and was slaughtered at same date, in Chicago. [Weight of animal 800 lbs.; weight of Spleen 8 lbs.]



SPLEEN OF A STEER THAT WAS SLAUGHTERED IN CHICAGO,

soon after arriving from Texas. [Animal in fair health; weight 800 lbs. Weight of Spleen 2 lbs.]





The wood-cut, No. 1, on the preceding page, is sketched from a photograph presented to us by Dr. Rauch, of a group of healthy and unhealthy spleens. In the second sketch is shown a group, selected by Sanitary Inspector Dr. Janes, at one of our city slaughtering houses, the small and natural specimens being from native or State cattle, the enlarged ones being from infected Texas steers freshly arrived from Texas, by way of Illinois.

The term "splenic fever," which has been applied to this disease, and the term "*milzbrand*" that is applied to a group of anthracic fevers in Central Europe, do not convey any correct idea of the essential nature of the diseases to which they are applied, though they thus prominently mention an organ which, from peculiarities in its anatomical construction, readily takes on certain very obvious morbid appearances.*

It would be difficult to find, in the whole category of human diseases, so striking an illustration of the disintegration and ultimate destruction of the blood, associated with so extensive and so rapidly produced fatty degenerations of tissues in the liver, spleen and kidneys. Yellow fever and malignant congestive (intermittent) fever are respectively attended by some of these changes; but we have witnessed no disease previously, in man or the lower animals, that has afforded such an opportunity for *demonstrating* the mode and the various results of blood-poisoning. The wasted, crippled and shrunken red globules; the transudations and ecchymoses resulting from this drainage of the vital fluid; the injurious and obstructive

* The familiar and expressive terms in which some of the best medical observers of the Texas Cattle Disease in Missouri and Kansas have described the symptoms, and the pathological changes produced by it, serve to convey some important facts which will explain various apparent discrepancies that have appeared in the descriptions of post-mortem appearances. The fact that the sanitary officers could make no scientific use of the putrescent mass of viscera, which was almost invariably found upon opening an infected animal that had been dead more than an hour or two, will explain, also, how different are most of the descriptions of their post-mortem dissections from those published elsewhere. For an illustration of the first-rate descriptions which have been given by some Western observers, who have been many years familiar with the disease, we quote the following extract from a report of Dr. Albert Badger, Nevada city, Vernon county, Missouri. Concerning post-mortem appearances, he says:

"In a very close observation of this disease among my own and neighbors' stock for the last thirteen years, I have generally found on opening those that had died but very little blood, and the following results: In those that passed water, mixed with blood, the kidneys and surrounding parts were entirely decayed, the other parts of the body sound; those that did not dung at all, or but very little, with manifolds perfectly dry and partly decayed, while the large stomach would be more or less mortified, other parts healthy; those that appeared to dung and pass water naturally, with a liver more or less decayed, the gall bladder always swelled to its greatest tension, other parts healthy; those that were over on their feet in a watchful attitude, the brain was found more or less decayed. This leads me to believe the disease to be in the blood, which finally becomes congestive, destroying the parts in a few hours after it becomes seated, and no doubt in many cases could be cured if we knew exactly when and where it had seated itself—blood-letting not being sufficient of itself to check the inflammation. The hollow horn and tail no doubt is caused by the fever destroying the blood in the extremities before it does in the vessels, which it does destroy in a great measure before death."

presence of resultants of this damaged blood in the tissues of the liver; the overwhelming of the spleen by the *debris* of the *spoiled* blood; the views which the microscope revealed of the condition of this *debris* and of the splenic tissues in the fatal stages of the disease, and during successful convalescence; and lastly, in cases that lingered beyond the acute stage, the presence of crystallized *hæmatoidine*—that beautiful signet and memorial of the destroyed blood globules and consequent transudations—in all loose tissues and the chief secernant viscera of the body, presented, together and in their various relations, the most remarkable, the most instructive, and, when studied with all the associated facts, the most conclusive results that could be met with in the physician's searches into the nature and consequences of pestilential diseases.

It would be impossible, in a mere report of events and particular results in the Committee's investigations, to place all of the more interesting and conclusive circumstances on record concerning particular observations in individual cases of the infected cattle. Each case, when carefully dissected and studied, presented striking "memorial tracings" of the morbid changes that had occurred in the blood. For example: An infected bullock was killed for dissection, October 18th, at the the National drove yards on Third and Fourth avenues. [This bullock's jaundiced skin, waxy and fatty liver, and partially restored spleen, are represented in Plate 23.] The fat surrounding the kidneys, and, to some extent, that of the omentum, was of a greenish and mottled appearance, and the cellular tissue contained some opaque serous fluid. The dissector cut the discolored fat with caution, saying there must be pus in it; but it was simply a mass of hæmatoidine crystals, which remained there as a signet left by the disintegrated red globules of the spoiled blood. In other cases, both lingering and acute, brilliant and discolored spots in pelvis of the kidney were found by Dr. Stiles to consist of hæmatoidine. Besides this beautiful seal, which the disease impressed upon the granular and cellular tissues, there always could be traced other series of proofs of the nature and results of the blood changes.

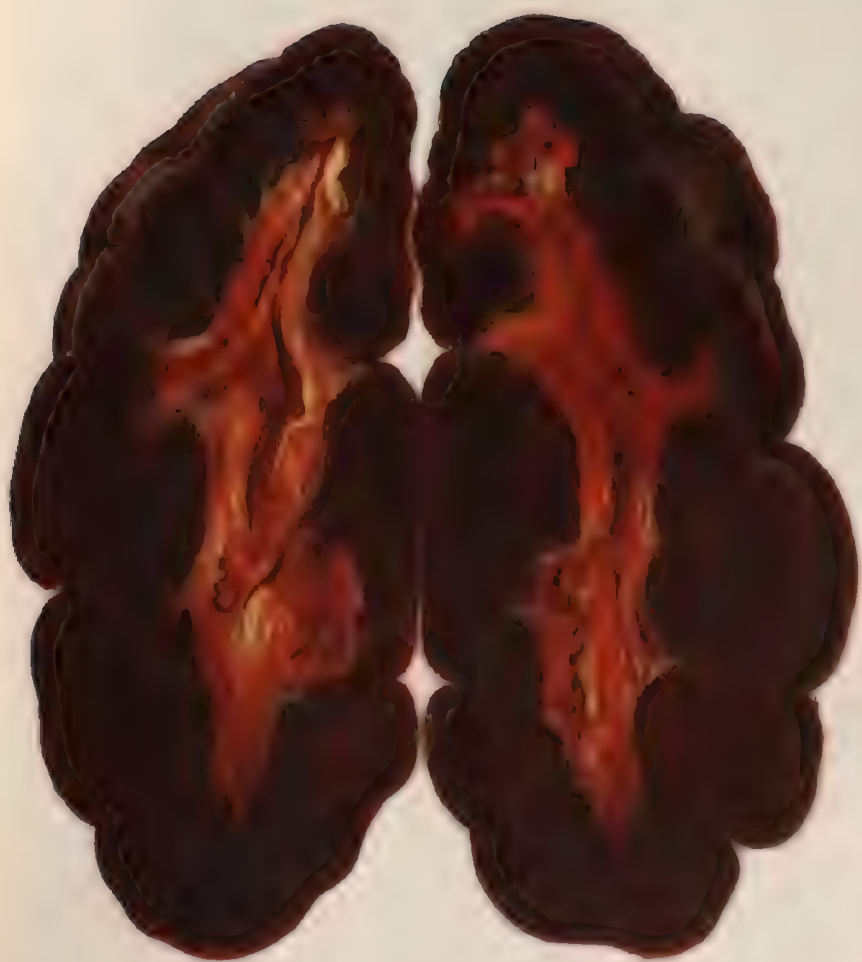
[Dr. William Aitkin, in his remarkably instructive chapter upon "Symptoms and Signs of Disease," happily epitomizes the facts relating to the source and significance of hæmatoidine crystals found in the tissues and closed cavities of the body, in the following remark: "Crystals of hæmatoidine are the most frequent products of blood degeneration (Virchow). They are formed spontaneously out of hæmatine. . . . If large masses of extravasated blood continue to lie for any length of time, this is the substance into which the blood is transformed. An apoplectic clot in the brain, for example, is repaired by a large portion of the blood (the clot) undergoing this transformation, and the color of the resulting cicatrix is due to the crystals of hæmatoidine. When a young woman menstruates, also, the cavity of the Graefian vessels, from which the ovum escaped, becomes filled with coagulated blood, and ultimately hæmatoidine crystals are the last memorials of the event (Virchow)."]





Kidney laid open
showing medulla, pelvis, & ureter





Brain laid open.
Showing the corpus callosum.





Fig. 1. Kidney.
Surface external (see page 17)

Fig. 2. Surface of kidney.
Surface internal (see page 17)

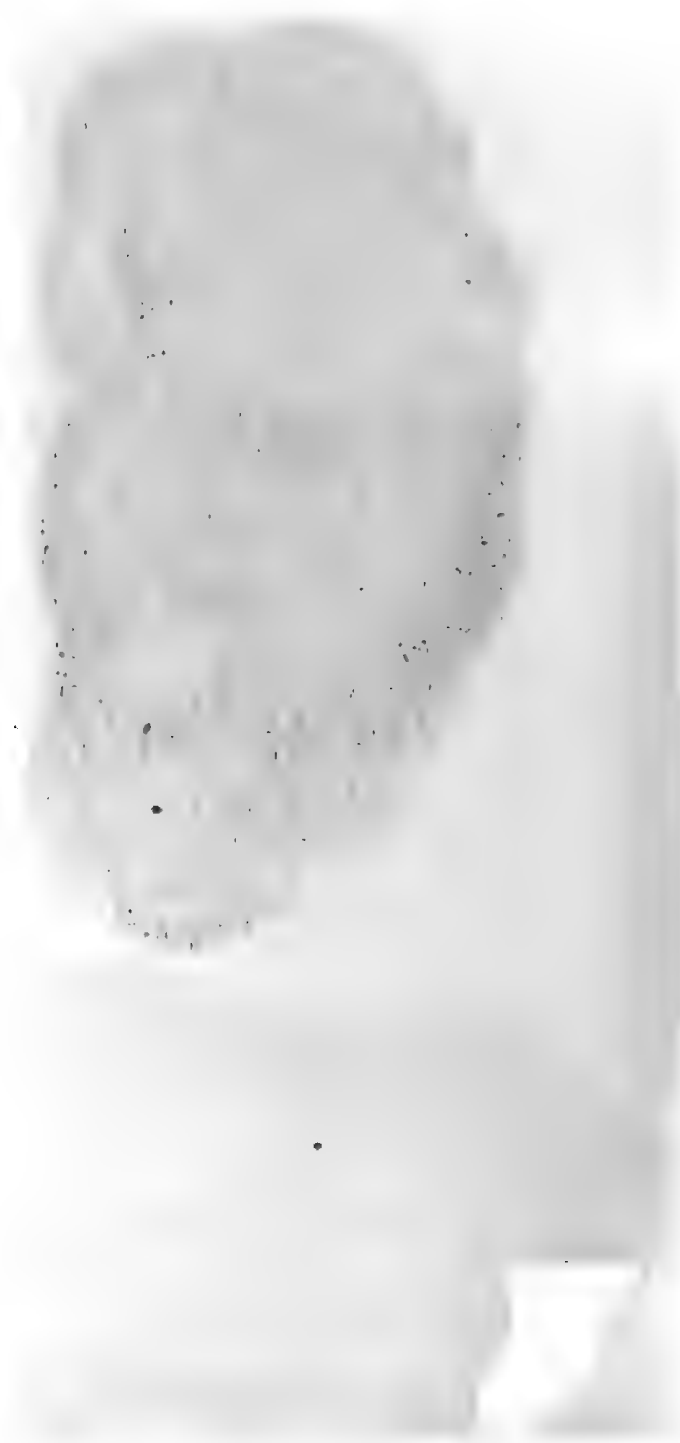












Fig. 1. Cross-section of the body of the worm, showing the internal organs. Fig. 2. Cross-section of the body of the worm, showing the internal organs.

The Kidneys.—Dr. Stiles submitted specimens of this organ to microscopical examination from all the cases of which he also had opportunity to examine the liver and spleen. The changes in structure are in harmony with those found in the latter organs and in the blood. The kidneys, indeed, contained very important evidences and signets of the rapid destruction which the red blood globules had undergone. Nothing could be more significant than the lodgment of crystals of hæmatoidine in the tissues of this depurative gland. The average general appearance of the kidneys in the infected bullocks which we slaughtered and dissected for purposes of scientific investigation is correctly shown in the plate on the next page. This specimen (Plate 19) and its mate (Plate 20, fig. 1) on the page following, were taken from a young bullock slaughtered at the National drove yards, One Hundredth street, September 26th. The two weighed five pounds eleven ounces. The appearance of the kidney during convalescence, at the end of seven or eight days in progress of recovery, is represented in Plate 20, fig. 2. This specimen was taken from the first convalescent of Mr. Alexander's herd, August 16th.

In many instance the morbid appearance was less marked than in the examples here represented; but in still more cases there was vastly more alteration in appearance, and with scarcely an exception, as is reported by all observers, there is usually a more morbid appearance of the kidneys than that which is here exhibited. But it is not the mere appearance, but in certain morbid changes which the microscope alone can reveal, that this organ has aided the general inquiry concerning this disease. Often, in the post-mortem inspections of cattle found dead, and in those slaughtered and allowed to remain a few hours, the kidneys were found utterly disorganized and almost as diffuent or broken down as the spleen in the same animals. A marvelous rapidity of disorganization and putrefaction of this and every other organ that was similarly engorged with blood, will be remembered by all observers as a decided characteristic. But it is a fact to be noted that the kidneys as well as the liver, kept up a remarkable activity of secretion, or at least of evacuation of morbid secretions, until a very late stage of the disease. The source and nature of the "black water," or hæmaturia are correctly illustrated in Dr. Stiles' report (Plate 7), and in the chemical analyses of urine and blood, by Professor Chandler. The loss of blood-albumen by the kidneys in this disease is in all cases enormous, and the blood analysis shows that this loss goes on *pari passu* with the disease, so that in long protracted cases it reaches a minimum percentage of the quantitative results in the table of analysis.*

The report of Dr. Stiles which follows in the next chapter, adequately sets forth the results of microscopical examinations of the three vascular organs that we have mentioned in this section, as being the chief objects of

* The decrease in the percentage of albumen in the blood manifestly depends upon three causes, viz., loss by waste through the kidneys; loss by the destructive effect of the fever in which this food for the blood has to meet unusual demands; and lastly, the failure of the sick animal to supply by its digestion of daily food.

interest in those pathological researches. All other organs and tissues of the body were in turn examined, but it was in these three organs, the most susceptible to morbid alterations in their organic and interstitial constitution, while, also, the respective functions which they severally perform in preparing the blood for its continued flowing as the healthful supporter of life, that distinctly and very peculiarly characterized alterations in structure, most important, far-reaching and fatal in results in the infected cattle were observed. But the statement must here be repeated, that it is not in the fortuitous changes of color, size and apparent healthfulness of these organs that the question of their healthful or their diseased condition is determined in an acute malady like this of the Texas Cattle Disease.

Devoted to special and vitally important functions of blood preservation, each of them containing characteristic marks of morbid conditions induced by the poison of the disease, and each in its own peculiar way, finally becoming embarrassed in function and organic structure, these organs were the subject of daily study by Dr. Stiles and various medical observers for more than three months. The results of that study have been worthy of the labor bestowed, for very important facts have been ascertained which throw light upon the nature and course of the disease that was under investigation, and at the same time contribute to the progress of important branches of medical knowledge.

NOTE ON SPECIAL CONDITIONS OBSERVED IN CONVALESCENT CATTLE THAT WERE SLAUGHTERED FOR DISSECTION.—In the report by Dr. Morris will be found an abstract of notes taken at the post-mortem examination of the five convalescent cattle belonging to Mr. J. T. Alexander's herd. They will repay perusal. Much might be added to these notes that would be interesting to pathologists, and also would be important to farmers and herdsmen that may have to deal with the disease. We will briefly recapitulate the most essential facts observed in the examination of animals known to be convalescent from the disease:

1st. *External Appearances.*—For several days the eyes appear jaundiced, the skin also, in certain cases, was seen to be deeply jaundiced; and this is strikingly shown in the case of a bullock that was slaughtered on the 18th of October, after being at least ten days past the commencement of obvious symptoms. The appearance of this animal is correctly shown in Plate 23, Fig. 1. The cases examined late in the autumn, like the one here mentioned, had cedematous legs, and exhibited a very flabby condition of surface.

2d. *The Temperature.*—Examined per rectum, the first of Mr. Alexander's convalescents (slaughtered August 16th) on the seventh day after last of the hæmaturia, gave a temperature of 103° Fah. The other members of that convalescent family, which came to their dissection for scientific purposes on the 26th of August, from twelve to sixteen days past obviously acute symptoms, gave the following temperatures: No. 1, 103°; No. 2, 103½°; No. 3, 103½°; No. 4, 103½°. In other instances of cattle partially



Plate XXII



Abangetum one week convalescent

W. H. C. C.

Lith. C. Allen, Brooklyn & New York, Albany, N. Y.

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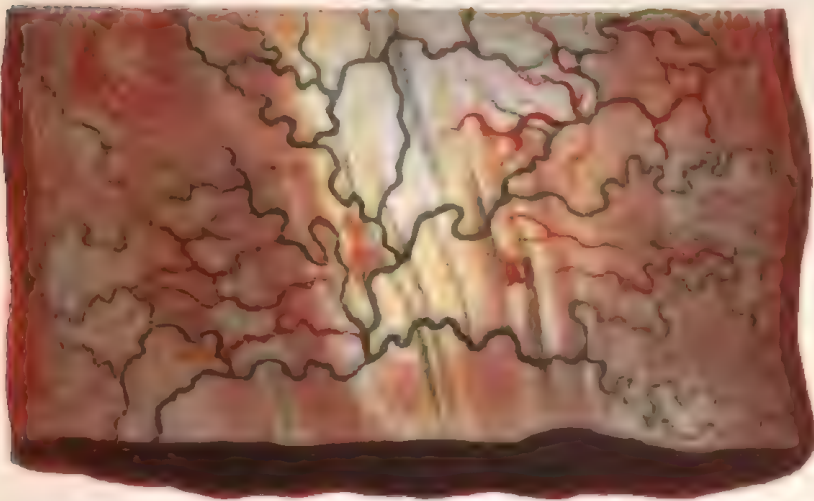
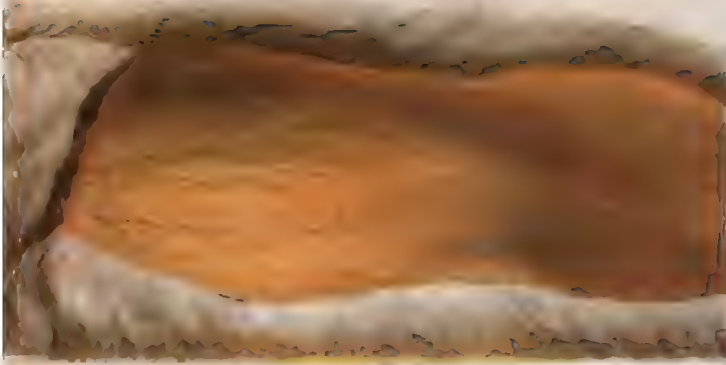
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recovered from the disease, there usually was some complicating condition that kept up the febrile temperature, as in the bullock whose jaundiced skin is illustrated on the preceding page. His temperature, when ten days or a fortnight past the obviously acute stage, but when suffering intensely from inflammation of the rectum and colon, and from the extravasation of his anæmic blood into the cellular (areolar) tissues of the body, was $105\frac{1}{4}^{\circ}$. In several of the imperfectly recovered Texas cattle, examined by Sanitary Inspector Janes at one of the butcheries—cases quoted by Dr. Morris in this report—the temperature was two degrees or more above the standard of health.

3d. *Condition of the Blood*.—In all the convalescents it was remarkably deficient in red globules and globuline, and in the percentage of salts, of albumen, and of total solids. This is shown in the chemical analysis of the blood of diseased bullocks by Prof. Chandler. [See his *Tabulated Analyses*.] The same fact was confirmed in the microscopical examinations of Dr. Stiles, in regard to the destruction of the red globules.

4th. *The Spleen and Liver*.—In every convalescent these organs exhibited evident traces of the disease. The weight and the unnatural appearance of the spleen seemed to be very tardy in the return to normal conditions. The spleen of the first examined convalescent in Mr. Alexander's herd (on the seventh day) weighed five and a half pounds, and was still soft and discolored; while the liver weighed thirteen and a half pounds, and was fatty and fawn colored. In convalescents killed later in the season, the "waxy" conditions were conjoined, and the former was evidently supervening upon the latter condition. In Plate 23 a section of such a liver is shown, also a section of the spleen. They evince a tardy return towards the healthy state.

5th. *The Abomasum or Fourth Stomach*.—A rapid tendency to recovery from the common erosions and ecchymotic conditions in the tubular or "reed" portion of this stomach was evinced in the well conditioned convalescents; but the deep sloughs and ragged ulcerations recovered slowly. Plate 21 exhibits the appearance of the tubular or "reed" portion of the abomasum in the first bullock killed in Mr. Alexander's group of convalescents, at Communipaw.

6th. *The Bile, the Blood*, and the vascular organs concerned in blood elaboration, continued to exhibit the yellow flocculi or pigment matter and the hæmatoidine crystals for some time. But the fungus spores ceased to be found quite early. The completeness and rapidity of this disappearance of the fungus parasite in the cattle that were medicated with carbolic acid was, at the time, a subject of unexpected satisfaction. It was reasonably presumed to be due to the action of the carbolic antiseptic upon the blood.

EXPERIMENTS TO TEST THE SUPPOSED METHODS BY WHICH THE DISEASE MAY BE COMMUNICATED.

In the beginning of our inquiries the fact became so unequivocally established that to the excrement of the cattle which introduced the dis-

case was to be attributed the means or vehicle of distribution and propagation of the infectious cause of it, that it was believed there would be a spontaneous demonstration of the possibility or the impossibility of the re-propagation of the poison by Northern cattle which were under observation and dying with the disease in the vicinity of New York. The only instances of such re-propagation by sick native stock are related by Assistant Commissioners Drs. Morris and Montfort concerning the herds in Orange county.

Dr. Stiles attempted some experiments by injecting a solution of infected bile into the blood-vessels of some of the lower animals, but they gave no other result than that of a speedy termination in fatal convulsions, as soon as the solution mingled in the general circulation.

The constant presence of the fungus-spores in the bile of the infected and dying cattle, suggested the propriety of instituting a series of experiments and tests upon such herbivorous and carnivorous animals as could readily be made to partake of simple foods garnished with a little of the morbid bile. To Dr. F. J. Randall, an Assistant Sanitary officer, the task of conducting the experiments was committed. Dr. Stiles followed up the examination of the morbid anatomy and microscopy of the fluids and diseased tissues whenever death ended the experiments upon any of these small animals.

The experiments on dogs was inconclusive. Dr. Mackay, the Health officer of Buffalo, had informed us that all his observations in feeding dogs with the flesh of the infected dead cattle ended in poor Tray's vomiting the food. Three dogs were kenneled and fed very sparingly on two of the enormous livers taken from infected cattle that were slaughtered for dissection. Two of them were attacked with an obstinate diarrhœa and one of them died at the end of twelve days. The stomach of the latter was ulcerated, but Dr. Stiles discovered no traces of the essential signs of the cattle disease. It was scarcely presumed that the dog would readily succumb to the poison if any pertained to the tissues of the liver and the bile they contained.

The facts regarding the pathological results of this feeding and incubation of the bile-poison, if poison it was, are summed up by Dr. Stiles in the second part of his report. He found all the characteristic lesions which the infection induces, and he remarks that the rabbits "died with many of the phenomena of the Texas Cattle Disease." Dr. Randall states that they died suddenly in every instance, after but a brief period of apparent illness. The only fungus-spores discovered in the dead rabbits were those known to mycologists as the *Cryptococcus guttulatus*. Regarding the practical inference to be drawn from these experiments, we would not consider them absolutely conclusive, because the absorption of morbid bile into the blood would in all probability produce the chief results that were observed by Dr. Stiles and Dr. Randall. Yet, so far as this series of results has any bearing upon the theory of this fever propagation by

means of this germ-element, they are regarded by Dr. Stiles as strongly confirmatory.

Experimental tests showing the effects that would be produced by the transfusion of blood from an infected bullock into a healthy one was scarcely practicable, as every medical observer was already overworked, and no pecuniary means were available for such experimentation. That class of tests remains to be made, together with several other experimental observations if the infection ever again crosses the Mississippi river.

INDISPENSABLE USES OF THE MICROSCOPE AND CHEMICAL ANALYSIS IN THE INVESTIGATION.—RESULTS.

The microscope and the chemist's laboratory are helps to the student of the causes and effects of disease, but they may as readily prove false guides as true, unless they are themselves directed by skillful and thoroughly experienced hands. The success that attended the labors of Dr. Stiles and Prof. Chandler, in their respective branches of investigation, will justly be regarded as among the most satisfactory results attained in the whole range of inquiry. The reports of those two co-laborers follow in next chapters. Divested of the technicalities of such studies, their results may be concisely translated into familiar phraseology, as follows:

What the Microscope has revealed concerning the Pathological Characteristics of the Cattle Disease.—(1.) That the red corpuscles of the infected blood are impaired, and, to a great extent, broken up before the death of the infected animal; and that, immediately after death, the disintegration of this essential and life-bearing constituent of the blood, as well as the other constituents, went on with amazing rapidity.

(2.) The chief change discovered in the liver, spleen and kidneys, consisted in the acute fatty degeneration or deposit, and in certain remarkable evidences of embarrassment in the circulation of the blood and of *destructive changes in it*. The presence of the crystals of hæmatoidine, and of a peculiar yellow matter, in these organs and in the bile, as well as in loose cellular tissues, were so remarkably demonstrated under the microscope that they came to be regarded as *signets* of the presence and operation of the disease upon the red blood-corpuscles. The yellow matter here mentioned also associated destruction of the red corpuscles with the presence of the morbid bile; and this circumstance, in the pathological condition of the blood, was rendered quite certain by other kinds of evidence.

(3.) The diseased *distension* of the minutest biliary ducts by the morbid bile, revealed a physiological fact regarding the minutest and previously undetermined character of the ultimate arrangement of those ducts and their relations to the secreting cells of the liver. This discovery by Dr. Stiles has served to aid in the investigations and deductions.

(4.) The exact nature and causes of the "black water" or hæmaturia, have been clearly defined by the microscope.

(5.) The nature of the morbid changes which occur in the spleen in consequence of the disease is clearly defined, so far as the microscope can reveal the altered conditions in that organ.

(6.) The presence of fungus-spores or an infinite growth of parasitical organisms, has been revealed as a constant fact in the blood and bile of the infected animals. And to test and develop, by experimental culture, the actual nature and botanical (mycological) classification of this fungus parasite, has been a separate undertaking. Furthermore, without waiting the results of such culture, the microscopical observations upon the bile, the minute tissues of the liver, and the morbid conditions of the blood, &c., are finally regarded as warranting the conclusion, that whether it may be an active and propagating element in the infectious cause of the disease, or only a concomitant of the diseased and feverish blood in the infected animals, it certainly seems to play an important and fatal part in the final morbid changes that occur in the bile, if the bile becomes, as there is no doubt it does at last, a destructive poison to the blood and the nervous centres.

(7.) The microscope has enabled Dr. Stiles, and Prof. Hallier (of the University of Jena), to trace the botanical and developmental history of the fungus element or "micrococcus."

In these, and in various other ways, the pathological investigation of the disease has been aided by the microscope in the hands of a most learned, careful and trustworthy physiologist and pathologist.

RESULTS FROM CHEMICAL ANALYSIS.

The Blood.—In the eight columns that present the results of the quantitative analysis of blood from fourteen infected bullocks that were slaughtered and carefully dissected for the purposes of our investigations, Prof. Chandler has clearly demonstrated the following facts:

(1.) The normal relative proportions of the total solid constituents, and the water of the blood in the infected cattle, was found to be changed, the healthful percentage of solids being much diminished, and in the most typical case of the disease this decrease of solid constituents was excessive. In a fine fat steer that had passed the acute or explosive symptoms, and was (ineffectually) convalescent, this decrease of solids in the blood was found to be equal to fifty parts in the 1,000 of blood, or of the one hundred and ninety of normal solids, that is, this loss exceeded twenty-five per centum of the natural total of solid flesh-forming constituents in the blood. In other instances in which the disease produced extreme symptoms in very fine and full fleshed animals, as in one that was carried to the rendering dock, and in two that were killed and carefully dissected September 11th and October 18th, respectively, the loss of solid elements of the blood was found to be nearly seventy parts out of the normal proportion (which is about one hundred and ninety) in the 1,000 parts of blood, or equal to thirty-seven per centum of loss of the substance of the blood. But the loss of solid elements

was not an invariable fact, though evidently quite sure to occur in extreme cases, and in all instances of lingering beyond a few days after the period of hæmaturia and the acute symptoms.

(2.) In every case of the disease there was a very marked loss of red blood corpuscles. The loss amounted to more than fifty per cent of the total quantity that healthy bullocks' blood contains; and, in the most striking cases, the loss of blood corpuscles and globuline was almost complete. In some examples (one of which Prof. Chandler has placed in his tabulated results) the destruction of this most essential element of the blood could not be estimated, so entire was the destruction and change.

(3.) The healthful proportion of salts in the blood was diminished in all the typical cases that had survived a few days after the onset of acute symptoms. The causes of this loss, as well as that of total solids were physiologically obvious in the class of animals in which it occurred.

(4.) Albumen was quite constantly found below the healthful proportion in most of the cases examined, but it was noticed as an excess of the normal amount in those cases of the disease in which the blood-corpuscles and globuline had undergone such changes as caused the red globule element to nearly or wholly disappear from the list of proximate elements.

(5.) The fibrin varied greatly in amount, but in the phenomena of coagulation, &c., never exhibited signs of an inflammatory condition. In some instances the fibrin appeared rotten and imperfectly elaborated; but in no specimen examined under the microscope did Dr. Stiles notice any unnatural state of fibrillation.

The foregoing five points of departure from the healthful standard of the blood elements are thus specially noticed, because they are directly associated with the essential cause and course of disease.

The Dropsical Effusions (Serum) in the Peritoneal Cavity of the Infected Cattle.—The effused dropsical fluid possessed the property of spontaneous coagulation when exposed to the air. Dr. Stiles' description of the peculiar mode of that coagulation shows that a pseudo fibrin was contained in these fluids. Prof. Chandler's analyses show that this fibrin was quantitatively estimated. In the remarkable case that was examined the 9th of September, the spleen was ruptured, accidentally, as we believed at the time, in the last struggles, or in the handling of the bullock. [See third analysis of serum and eighth analysis of blood, in Prof. Chandler's tabulations.]

Chemical Analysis of the Bile.—The results are recorded without comment. There may be readers of this report who would ask for these results, and the time may come when this class of facts will aid in other inquiries.

The Urine.—The albuminous state of the urine was in all cases remarked, and in most instances this wasting of the substance of blood by the urinary organs was extensive. The morbid changes that were occurring in the blood itself—by damage to the red globules and to the fibrin—would account for this wasting, even if the kidneys had not been found to be undergoing acute degenerative changes, and suffering from hæmaturia.

And it is worthy of notice that the congestion of the kidneys (usually excessive, but in some cases unnoticeable,) did not result in obstruction and suppression of urine, but usually in an excessive flow of it.

Chemical Analysis of the Liver.—It was not until cold weather arrived that any analysis of this organ was attempted. The specimens were not as excessively fatty as livers dissected earlier in the season. They were changing into what is termed the "waxy" condition, in which the minute cell-walls are simply thickened by plastic matter, and, as before remarked, there was far less fatty deposit than in the livers that were not "waxy." Dr. Stiles states that the microscopical examination of the livers thus analyzed, contained less than half the proportion of free fat which those had that were examined earlier in the season and in the acute cases. But even the four examples presented in Prof. Chandler's analysis, show an excessive percentage of fat. Here we see no less than sixty-two and a half, sixty-six, eighty-eight and a half and ninety parts, by weight, of fat in 1,000 parts of the liver substance, in livers that had, in the lingering stages of the disease, changed to the "waxy" condition. Frerich found only twenty-two parts of fat to 1,000 of substance in a waxy liver, and one hundred and seventy-two parts in a fatal case of "fatty liver."

In pursuing a pathological inquiry upon yellow fever in man, the writer submitted a specimen of a liver from a sea captain that died of that disease, to Prof. Chandler for analysis. The man had died on about the twentieth day from the beginning of incubation of the disease at the port (Vera Cruz) whence he sailed. The liver was the most perfect specimen of the *café au lait* or dry and fawn colored condition of that organ, as witnessed in lingering cases of that malady. The following is the result of the analysis: Water, 739.84; total solids, 260.16; fat, 96.31.

Dr. Stiles' microscopical analysis of a specimen of the same human liver, pronounced it a typical example of yellow fever liver, as had also the writer's professional examination of the body and history of the patient the previous day enabled him to do. It seems desirable to place these facts on record here, though they relate to a pestilence in the human family.

Experiments and Tests for the Verification and Settlement of Questions that have Arisen in the Course of the Investigations.—The chief experiments of this kind relate to the attempts to cultivate the fungus spores that infest the blood and bile of the infected cattle. Though these experiments, and certain collateral inquiries relating to the sources whence they may have been derived, are still in progress, and may be continued a year or more, the chief object of such culture-experiments should be stated here. The design of the effort is not so abstruse as may be supposed. Divested of details, and of the marvelous things that are associated with the several stages of development in the parasite fungi, the object and the art of spore and parasite culture may be stated in ordinary phraseology as follows:

The spores or vegetative germ matter found in the blood and bile of the infected cattle, present, in the fresh specimens, certain peculiarities that are sufficiently definite to enable skillful microscopists to recognize them

with considerable certainty. We presented to Prof. Hallier, of Jena, sealed specimens of fresh bile from infected cattle, without intimating to him what results Dr. Stiles had obtained, and his description of what he saw exactly accords with what Dr. Stiles and his associates witnessed. This spore-growth in the fluids of infected cattle is, so far as Dr. Stiles was able to ascertain, invariably of the low or primordial kind of mere multiplication and growth, which is the germ-mass or micrococcus of Prof. Hallier. Growing and repropagating, away from all direct exposure to the atmosphere, this kind of spore is termed *anaerophytic*, or growing without air. This circumstance of anaerophytic multiplication and rapid growth is not singular, for the *oidium lactis*, or fungus of milk—also anaerophytic—illustrates this kind of vegetation; but it is manifest that the circumstances of such parasitic growths must necessarily occur wholly at the expense of the constituents of the fluid in which they float and multiply, for they grow without the aid of atmospheric air. As the spore-forms (or as the *micrococcus*, *cryptococcus*, *zoogloæ* or *cylindro-tænum* forms), of fungus organisms all have relations to the higher and more complex development of plant-like fungi and algæ, the planting and cultivation of the micrococcus or spore-matter has become an art that promises important results. The very first contributions of the practically useful results of that art were given to hygiene. We refer to the study and development of the fungus-forms that pertain to the excrement of the cholera sick. And as the world is indebted to Prof. Hallier, of the University of Jena, for the chief discoveries and improvements that have been made in this difficult art of studying the progressive stages of cryptogamic development from the spore-matter or *micrococcus* up to the plant-like stages of growth, we secured the coöperation of that learned naturalist with Dr. Stiles. He has presented his researches upon specimens of fresh bile that we sent to him under seal. The statement of results in this fungus-culture by Prof. Hallier, will be seen in the communication from him, which we append to Dr. Stiles' report in the next chapter.

There is much reason to believe that this spore-growth, which both gentlemen are studying, will be found to belong to certain parasite fungi that infest the coarse herbage which covers certain tracts of country over which the Texas cattle are driven before reaching the Osage, the Red, or the Mississippi rivers. Some of the grasses of that region are already under examination of Dr. Stiles and others. No final results can be reached immediately in such an inquiry, but the clear and definite progress already made in this line of researches is sure not to end in barren uncertainties. Yet it must not be supposed that a correct general knowledge of the "Texas Cattle Disease" will not be attained independently of this promised contribution from the natural history of the fungus-spores of the infected blood and bile of the cattle and of the parasites which infest the herbage of the cattle trail. These toilsome researches may result in unveiling one of the hidden and all-important *factors* of a class of epizootic and epidemic pestilences that hitherto have defied all attempts to interpret their

mysterious origin, and to discover the nature of the virus or germs by which they are propagated as spreading pestilences.

In the present state of medical knowledge, we can only designate this probable fungus or parasito element in the cattle disease as a *factor* in the sum of causes.* It may be the essential and most important factor, or it may be subordinate to some others; but it now seems probable that the transportation and spreading of the disease by the Texas cattle, would be impossible, if this practical element or factor were absent or were controlled. It is not unreasonable to presume that the presence and destructive, as well as irritant effects of this fungus parasite in the blood and the liver, would almost necessarily induce the very changes and fatal conditions which are actually found in the cattle that die of this disease. But science and the art of sanitary prevention of disease will lose nothing by accepting all the facts and possibilities on this subject, in the same cautious and exacting way in which we have ventured to mention it in this report. That the effort to discover the precise nature and source of the *infective carrier* of the pestilences which are spread by means of *excrement*, as in the case of cholera, typhoid fever and this disease of cattle, will, ere long, be successful, and will lead to the extinction or effectual prevention of them, is regarded probable. And there is reason to believe that this disease of cattle will yet furnish a clear demonstration in this line of study into the causation and spreading of this and some other pestilences.

• "In the great field of the epidemic and contagious disorders by which the animals that minister to man are afflicted, a rich harvest yet remains to be gathered. . . .
 • . . . A searching investigation into them would open up analogies that could not fail to be of the deepest interest in their bearing on the great group of kindred maladies which are so fatal to man. It is not too much to say that many a vexed problem relating to these last would here find a ready solution. It is, in fact, only by thus extending the survey that it is possible to obtain a just and comprehensive view of the nature and mode of propagation of that great and remarkable brood of morbid agents which are the material cause of contagious diseases, and which, low as they are in the order of created things—as yet undefined in nature, but specific in essence—are so destructive to men and animals alike. . . .

"By this and other means so employed, we might, in no long time, succeed in investing our knowledge of whole provinces of disease with much of that precision which is the charm of the physical science, and medicine's greatest want. By the same means, we should gradually be accumulating data whereby to make the work of prevention sure, and thus help towards that great consummation to which we may even now confidently look—the ultimate deliverance of man from that vast brood of contagious diseases which at present seem to mock his power—whose very existence is a humiliation to him, and which, under the form of slighter visitations or of wide spread pestilence, bring every year so many millions to the grave by a cruel and ultimately death."—*On the Occurrence of the Malignant Pustule in Man*, by William Budd, M. D., London, 1863.

V. REPORT ON THE PATHOLOGY OF THE TEXAS CATTLE DISEASE.

By R. CRESSON STILES, M. D.

To ELISHA HARRIS, M. D.:

Sir—The following contributions to the pathology of the disease which has recently proved so fatal to the cattle forwarded from the west to the New York market, are based upon microscopical examination of the diseased organs collected at various abattoirs in the vicinity, and upon experiments upon the nature of the morbid secretions. The uniformity of the elementary alterations of structure, amid a variety of diseased appearances in both solids and fluids, was one of the most interesting and satisfactory features of the epidemic. It establishes the existence of a well-defined group of symptoms and of corresponding pathological changes of structure which it is of the highest importance, both practical and scientific, to record accurately and publish widely.

With the etiology, symptomatology, therapeutics and prophylaxis of the disease, this report has no concern. On several occasions I was present at the post-mortem examination of diseased cattle, and collected such specimens as I required for study, but by far the greater number were forwarded to me by yourself, or by your friends in Chicago and the West, where the disease has prevailed to a far greater extent than in our neighborhood. From whatever source derived, the same story was told by all; the epidemic which has destroyed thousands of cattle in the West, was identical with that from which the Board of Health has sought to protect our markets for the past three months.

PART FIRST.

I. THE FLUIDS.

(1.) *The Blood.*—The blood examined was usually drawn from the aorta or carotid arteries at the time these were severed in slaughtering the animal. In other specimens it was taken from the jugular vein during life, or from the portal vein after death. In none but the last was there any marked peculiarity by which it was distinguished from the foregoing. It coagulated firmly in a large and deep vessel within fifteen minutes, without a buffy coat. In no case did the quality of the fibrin seem impaired. It presented invariably a delicate fibrillation when in shreds, and a finely granular appearance when in mass. The red blood-corpuscles when examined immediately after removal from the blood were crenated and crenated, without artificial provocation, as required in the examination of blood. In

one case, many of the discs appeared to have lost a portion of their substance, as if a circular piece had been punched out, the addition of water failing to restore the disc to its completeness. In one specimen only, the white blood corpuscles were in great excess and aggregated in masses. The *liquor sanguinis* was invariably of a yellower color than natural, and contained minute yellow flocculi or flakes of granular matter of irregular size and shape, as represented at *c, c*, Plate No. 1. After a clot had formed the serum was found to present a yellow tinge, due to a diffused coloration. The source of the yellow coloration was indicated by the occasional presence in the serum, after standing for several hours, of rhomboidal-notched plates, such as were found also in the bile, and consisted probably, of cholesterine. In several instances, defibrinated blood, or serum poured from a clot, which originally abounded in corpuscles, was found after a few hours to be absolutely devoid of the latter, complete dissolution of the red discs having taken place long before putrefaction.

The specimen of portal blood abounded in white blood corpuscles, and in morbid cellular elements from the parenchyma of the spleen.

(2.) *The Bile*.—The bile was, in all the cases which fell under my observation, abundant, distending the gall bladder to its utmost capacity, filling the hepatic duct, and constituting the principal portion of the contents of the small intestines. Instead of presenting the normal greenish or brownish transparency, it was opaque, thick and grumous, nor was its opacity lost on filtration. It contained granular flakes and masses of a brilliant yellow or orange tint to transmitted light, reddish brown on the filter by reflected light, as represented at *a a*, Plate 2. These were in many cases so abundant as to give the bile a semi-solid consistence. They presented, when the bile was most dense, a crimson coloration, and were then mingled with granules and stellate crystals of hamatoidine (Virchow), *c c*, Plate 2. These yellow flocculi abounded in the hepatic duct and its branches, and were found at times impacted so that they might have offered resistance to the flow of the bile into the gall bladder. Some of the yellow coagula had been moulded by the smaller biliary ducts into cylindrical casts, *b*, Plate 2, and were found presenting this shape in the gall bladder. Plate No. 2 represents the appearance of a drop of bile under a magnifying power of five hundred diameters.

It was evident that the source of the yellow flocculi in the bile was an admixture of blood with the bile in the minutest ducts within the substance of the liver. The blood corpuscles being dissolved, the coagulating fibrin imbibed the bright yellow dye of the mingled coloring matter of the bile and the red blood corpuscles.

I have preserved specimens of this morbid secretion for nearly three months. They manifest no tendency to decomposition, but give off a sweetish aromatic odor; crystals of oxalate of lime have formed in the yellow flocculi, and micrococcus germs have multiplied so as to form masses visible to the unassisted eye.

(3.) *The Liquid Contents of the Small Intestine* abounded in the yellow flocculi of the bile. The hardened fecal masses in the large intestine consisted of homogeneous yellow granules (the result of condensation of the yellow flocculi) mingled with epithelium and vegetable debris. Constipation was a prominent symptom in most cases. Of the bile, therefore, which so abundantly poured into the alimentary canal, but a small quantity left the body in fecal evacuation.

The fourth stomach and intestines were occasionally filled with coagula of blood. Specimens of coagula were sent me, but I did not witness a case of the kind.

(4.) *The Urine*.—The urine was opaque, and black, with a crimson reflection. It formed a solid coagulum on boiling. When much diluted with water it became of a claret color. Blood-discs were rarely found in it, but coagula of granular fibrin, *a a*, Plate 3, enclosing debris of blood corpuscles and dark crimson granules, and molded into casts of the tubuli uriniferi, were of frequent occurrence. The dark red coloring matter of the broken-down blood discs was diffused through the urine.

(5.) *The Peritoneal Cavity* contained a yellow liquid which owed its tint to a diffused coloration, and was spontaneously coagulable on exposure to the air. In one case, where a few drops of blood had been accidentally mingled with it, coagulation continued for two days, and until putrefaction commenced. A fresh gelatinous clot formed in the liquid as often as it was poured from the coagulum previously formed. This was but one among many interesting physiological phenomena revealed by study of this disease.

II. THE SOLIDS.

(1.) *The Liver*.—The liver was invariably enlarged and congested, its surface marked by yellow patches, or of an uniform yellowish discoloration. The surface of section presented yellow spots on a ground of deep congestion. Under a low magnifying power, a thin section presented the appearance represented in Plate No. 4. A translucent center of bright yellow was seen in each acinus, *a*, Plate 4, surrounded by an opaque zone, *b*, Plate 4, of mingled fatty degeneration and yellow injection. Surrounding each acinus was the fibrous striation of the capsule of Glisson, *c*, Plate 4. Under a power of five hundred diameters, the yellow color of the center of each lobule was seen to be due to the repletion of the ultimate biliary radicles, forming a regular net-work between the liver cells, with bright yellow secretion, *a*, Plate 5. About this, and shading into it, was a zone of fatty degeneration, which affected the superficial or portal portion of each lobule. This fatty degeneration was sufficiently marked to render the liver cells opaque, but the nucleus was still visible in many of them. The injection of the reticulum of bile ducts was the most interesting phenomenon presented by the disease, not only on account of the opportunity it afforded of studying an anatomical structure, which has given rise to much discussion among histologists, and concerning which great difference of opinion still exists, and on account of the beauty and perfection of the anatom

demonstration, but owing to the important relation which this phenomenon bore to numerous manifestations of the disease. The cause of the difficulty in determining the mode of origin of the bile ducts, was seen to consist in their fragility and intimate association with the liver cells, each cell on being separated from its neighbors carrying with it its portion of biliary reticulum. The delicacy of the membrane forming the walls of the reticulum, renders its thorough injection impracticable, and its recognition, when empty, impossible. The brilliant tenacious secretion of the liver in this disease distends and reveals every portion of the biliary channels. The larger ducts between the acini can be recognized in every carefully prepared section communicating with the intra-lobular reticulum. Immediately after death, the yellow secretion begins to pass out of the reticulum by exosmosis, and to tinge the liver cells with a diffused yellow coloration, so that it is difficult to preserve the biliary reticulum for anatomical demonstration. Plate 6 represents the liver cells examined several hours after death. In other specimens the injection is more permanent, and I have been enabled to save for demonstration portions of diseased liver which still reveal the most marked phenomenon of the disease.

The source of the bright yellow coloration of the bile was evidently in the hæmatoidine (Virchow) of the broken down blood-discs. The coagulating fibrin of the effused blood, absorbing this yellow dye, formed the characteristic flocculi of the bile; the same absorbed by the capillaries of the liver gave rise to the yellow flakes circulating with the blood, and found abundantly in the spleen.

The mucous membrane of the hepatic duct was always of a bright crimson hue.

In one instance, in which the injection of the reticulum of bile ducts was most marked and most permanent, there was no fatty degeneration of the enlarged liver, but a waxy appearance.

(2.) *The Kidneys.*—The kidneys, in every post-mortem that I witnessed were enlarged, deeply congested, black on the surface and in section, the cut surface giving issue to an abundance of dark blood. The natural distinction of color between cortical and tubular portion was effaced. The tubuli uriniferi of both the cortical and tubular portion were rendered opaque by a deposit of granules of fat in their epithelium, and their cavity was occupied, for the most part, by coagula, reddened or blackened by debris of blood corpuscles, and by granules of dark crimson pigment, with occasionally a recognizable blood disc. Plate No. 7 represents the appearance of the tubuli of the kidney, as affected by the disease. The Malpighian bodies were not affected, but blood was occasionally found effused within their capsule. The tubular presented the same alterations as the cortical portion. In one instance, in which the projecting cones of the tubular portion presented to the unassisted eye a glittering yellow coloration, it was due to rhomboidal plates and stellate crystals of hæmatoidine. Minute yellow oily drops were occasionally found scattered through the epithelial lining of the tubes.

An interesting alteration in the effused blood was noted in cases of long duration, and during convalescence. The red pigment within the tubuli was changed into melanine, and black pigment granules filled the epithelium of the tubuli. The transformation of hæmatoidine into melanine was beyond question. Long after every other morbid character had given place to healthy structure through convalescence, the cortical portion of the kidneys retained the black coloration due to granules of melanine.

(3.) *The Spleen.*—Increased size and weight of the spleen was an invariable accompaniment of the disease. At the same time the consistence was diminished to such a degree that it gave issue to a soft black pulp on section, in which all trace of structural arrangement was lost. The increased size of the spleen was not due to congestion merely. A remarkable alteration was presented by the nuclear and cellular elements of the parenchyma. The nuclei (nuclear epithelium, Robin), or the same with delicate cellular investment, which in the natural state, fill the closed vesicles of the Malpighian bodies and the trabecular interspaces, were replaced by the large cells undergoing fatty degeneration, which have been represented in Plate 8. In some instances, yellow flocculi were found free in the splenic pulp; in others, cells filled with black pigment granules and crystals of hæmatoidine were abundant. The appearance presented in Plate 9 always accompanied convalescence. The cellular elements rapidly regained their normal character, but the pulp was filled with minute homogeneous rounded yellow granules, or with spherical or oval aggregations of the same.

(4.) *The mucous membranes* of the fourth stomach and intestines, and of the urinary and gall bladders, presented a diffused redness, with minute petechial spots, in which coagulated blood was found filling the distended capillaries. The epithelia of these membranes presented no marked alteration. The various states of congestion and ulceration in the alimentary canal offered no revelations of interest to microscopical study.

(5.) *The muscular system* presented a darker coloration than in healthy animals, but under the microscope revealed no alteration in structure.

(6.) *The nervous system* was entirely free from discoloration or structural change.

(7.) *The adipose and areolar tissues* were tinged by a diffused yellow coloration. Occasional yellow flakes were found in them, and about the kidney circumscribed extravasations of blood. Beautiful crystals of hæmatoidine were found in old extravasations.

(8.) *The lungs* were remarkably free from acute disease.

PART SECOND.

CONCLUSIONS IN REGARD TO THE PATHOLOGICAL NATURE OF THE DISEASE.

To sum up the results of microscopical investigation, and give the pathological conclusions to which they point, the Texas Cattle Disease is an acute, infectious, febrile disorder, attended by morbid action of the liver, its most distinctive phenomena being explicable as the results of the hepatic affection. The dissolution of the coloring matter of the blood corpuscles in the liquor sanguinis, and the hæmaturia are consequent upon the entrance of bile into the blood-vessels in whatever manner effected. In the experiments of Kuhne and Frerichs, the injection of bile, or of its salts, into the blood, was followed in the great majority of their experiments, upon the lower animals, by the appearance of blood in the urine. The solvent action of the bile upon the blood corpuscles, and the consequent liberation of their coloring matter can be readily witnessed under the microscope, each disc disappearing suddenly, like a light blown out, and the liquid assuming an orange tint. The blood thus altered in character becomes liable to extravasation, other hæmorrhages than hæmaturia being frequent attendants upon attacks of jaundice.

That bile is mingled with the blood is proved by the yellow color of the serum, its yellow flocculi, its crystals of cholesterine, by the yellow drops in the epithelium of the tubuli uriniferi, by the yellow granules in the spleen and by the hæmaturia. These results cannot follow the mere accumulation in the blood of the constituent elements of bile; the proximate principles of the bile itself are there found. The liver is excited to excessive secretion, the product of which distends to excess the channels and reservoirs of the bile, and fills the intestines. It is not unusual to find cases of icterus in man thus accompanied by excessive biliary secretion.

That the greatest facility exists for admixture of bile with the blood is shown by the repletion of the reticulum of bile ducts in immediate contact with the capillaries of the liver, as well as by the abundance of bile exposed to absorption by the mucous membrane of the intestines. In the experiments of Dr. Randall, under your direction, in which rabbits were fed upon bread soaked in the bile of the Texas disease, death ensued in from one to four weeks, according to the amount of bile consumed. In these experiments the poison was absorbed by the mucous membrane of the alimentary canal. The stomach was found ulcerated and containing extravasated blood, the liver was softened and fatty, the bile was of a bright claret color, and contained coagula; the kidneys were deeply congested; thus death was caused by the absorption of bile, with many of the phenomena of the Texas disease in a chronic form.

The only alternative to this admission of the vitiation of the blood by bile is the hypothesis that the destruction of the blood corpuscles through another agent—that of the infection, for example—permits an accumulation of hæmatoidine, or of the coloring matter of the bile in the blood, beyond

the capacity of the liver to remove it. The yellow flocculi of the liquor sanguinis and the spleen would, however, be inexplicable on this hypothesis, while their formation through the agency of the liver is manifest.

Quite early in this investigation my attention was attracted to the existence in the diseased bile of minute vegetable germs, which multiplied abundantly in the various specimens of bile preserved for analysis. They existed in the form of spherical or irregular aggregations of micrococcus (Fig. 1, Plate 10), the nature of which could be determined only by the employment of the highest powers of the microscope, and by studying their development. They were found in fresh blood and bile, but with difficulty. In specimens of bile collected in the evening, they would be found abundantly in the morning; the white color of their aggregations contrasting with the yellow hue of the flocculi of the bile to which they were attached, and from which they seemed to be derived, their abundance being such as to preclude the idea of their derivation from any other source than the blood or the bile itself. A magnifying power of over one thousand diameters and a lens of good penetrating power were necessary to their definition. Within a few hours of removal from the body, numerous cryptococcus (or torula) cells, resulting from the development of the former, were found, often containing crimson granules, as represented in Fig. 6, Plate 10. Specimens of bile and blood were collected from healthy animals and carefully examined, but in no instance did the forms described make their appearance. The ordinary attendants on putrefaction were alone described. Whether these forms of micrococcus and cryptococcus were merely accidental and attendant on a process of fermentation taking place in the bile, or were peculiar to the disease, their presence was an interesting fact, and their nature deserving of careful investigation. Their development was accordingly studied under various conditions. They were planted in solutions of sugar, gum and saliva, which had been boiled in order to destroy whatever germs of a different nature the solutions might contain, and were kept hermetically sealed at a temperature of 100° Fahrenheit for several days. The resulting anærophytic forms (cryptococcus and torula, Fig. 4, Plate 10, were planted on slices of apple, etc., and their development was noted, as represented in Plate 10. After a period of two weeks the planted area was found covered with penicillium, as represented in Plate No. 12, while the rest of the surface was free from vegetable growth. At the same time cryptococcus guttulatus, from the intestine of a rabbit which had been fed on the morbid bile, was also planted on slices of apple, and the germination represented in Plate No. 11 noted. This was done for the purpose of comparison merely, cryptococcus guttulatus being constantly found in the rabbit. The cryptococcus from the bile, however, manifested very different phenomena, although under precisely similar conditions with the former. After two weeks it had merely increased in quantity, aggregations of spores having been formed visible to the naked eye, but no filaments.

These forms of micrococcus and cryptococcus are but grades in the life of higher organisms. Thus, Hallier gives the following forms or "morphes" of *Achyra Prolifera*:

	<i>Anærophytic</i>	<i>Schizosporangium</i>	<i>Ærophytic</i>
<i>Ripe form</i> ..	<i>Tilletia caries</i>	<i>Sporidesmium</i>	<i>Cladosporium</i>
<i>Mould</i>	<i>Oidium lactis</i>	<i>Mucor racemosus</i>	<i>Penicillium</i> <i>crustaceum</i>

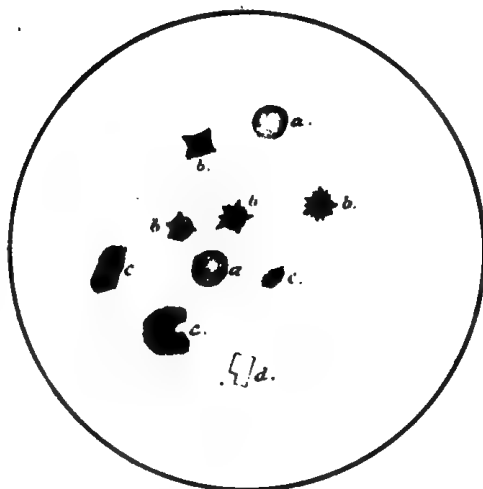
I have taken warning from the numerous disappointments of microscopists, whose spores and germs of disease have sprouted luxuriantly for a while in popular reputation, but have had a mushroom duration only in the annals of science. I am aware that the micrococcus and torula forms of fungi, alike in all, give no evidence of their nature and origin, and that all that can be said respecting those I have had under my observation is, that it is possible that these germs, developing luxuriantly in the bile and voided with the feces, may be the source of the contagion which proves so fatal in the western pastures where Texas cattle have occupied them in advance of native herds. Whatever may be the bearing of these researches upon the etiology of the disease, they have an abstract interest and value independently of their practical application.

The fungus origin of symotic diseases is now conceded by the highest authorities in mycological research, and the Texas fever is one which points with unusual clearness to this mode of propagation. That Texas cattle should communicate the disease while in a state of apparent health, and that Northern cattle dying from the virulence of the infection should be, as a rule, incapable of communicating it, can be readily understood on the hypothesis that a definite stage or amount of development is required by the organic germs of the contagion before they become capable of giving off the infectious spores by which it is propagated. The history of yellow fever shows how complete may be the immunity acquired by acclimation against a virulent form of contagion; and if the disease we have been studying were denominated "bovine yellow fever," no fault could be found with the designation. It is now admitted that persons in apparent health may convey the germs of cholera Asiatica from an infected district, their excreta undergoing a kind of fermentation through the multiplication of fungus germs, rendering them highly infectious.

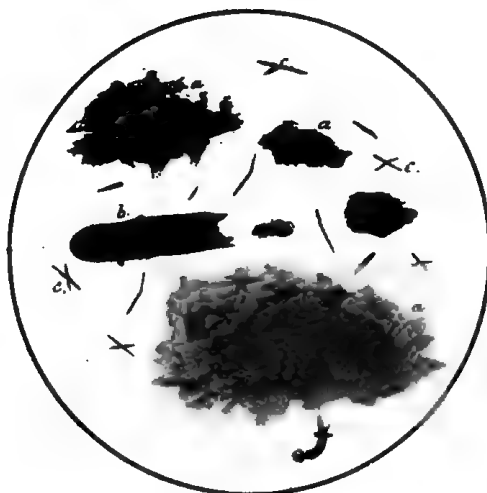
According to recent researches, the different stages in the development of the same fungus possess very different properties and react very differently upon the human system. Thus the best authorities assert that *achorion schenleini*, which is known to be the cause of *herpes circinatus* and of favus, as I have proved also by my own experiments, is but an oidium form of the same plant, which gives origin to *penicillium crustaceum*. If so, what limit can be set to the morbid capabilities of the commonest species of fungus? Their capacity for mischief must be as varied as the conditions of their development. So pliable are these low forms of vegetable life,

Blood and Hile

1



2

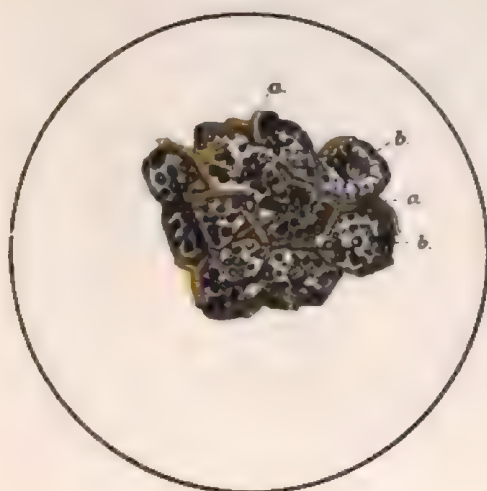


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Reticulum of Bile-ducts.

4½



5





Liver and Kidney

6



7



See page 100 for description of figures



Liver and Kidney

6



7

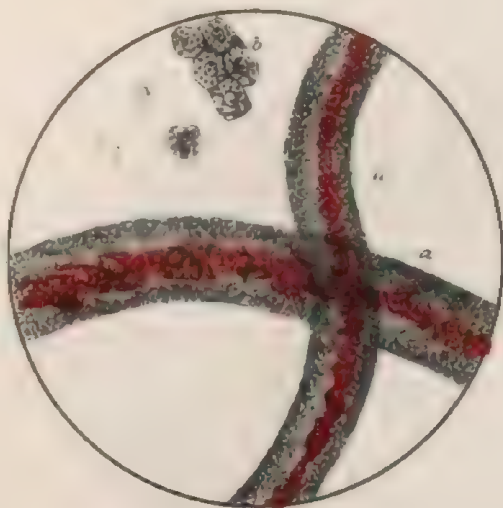


Fig. 1. Liver and Kidney.



Microorganisms of Bile

10



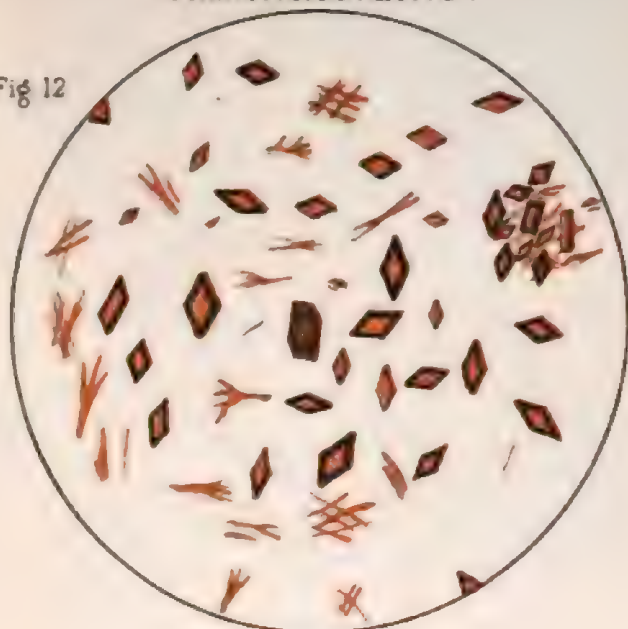
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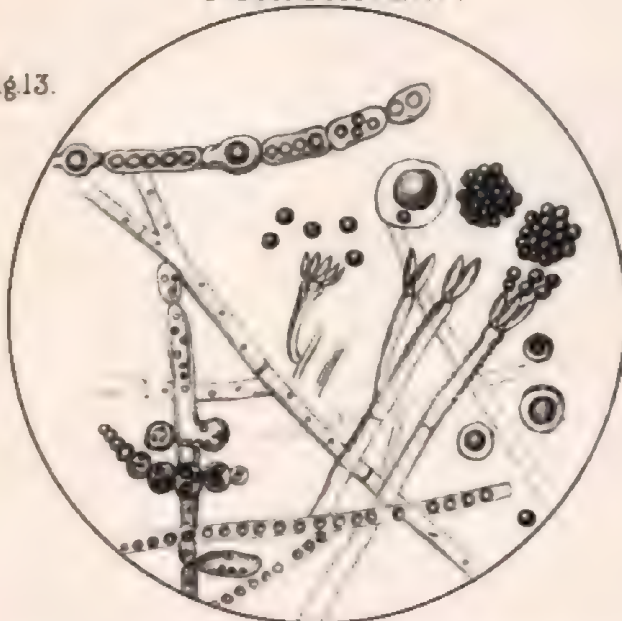
Haematoidine.

Fig 12



Penicillium.

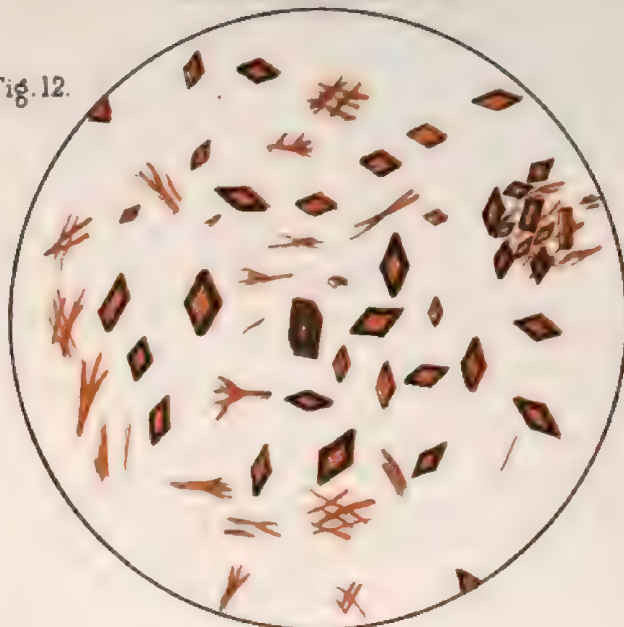
Fig 13.





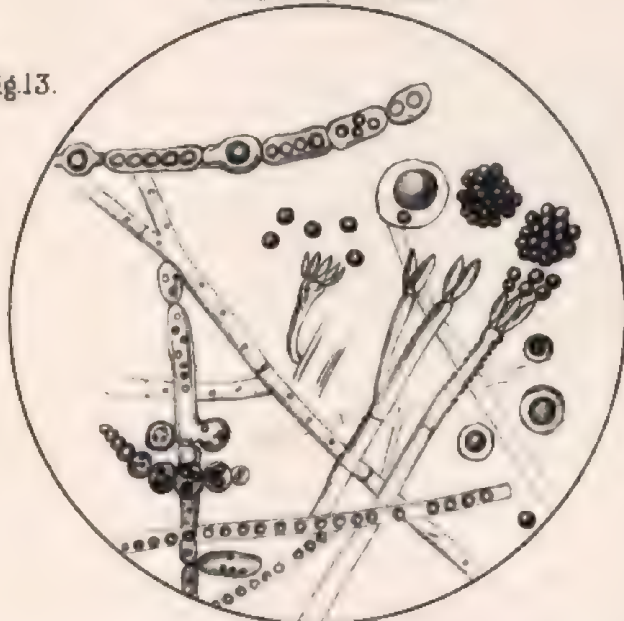
Haematöidine.

Fig. 12.



Penicillium.

Fig. 13.





that their injurious influence upon the human system, and upon the animal organism, need not be sought in their specific character, but may be ascribed to a virulence acquired by the circumstances, conditions, direction and degree of their development. This fact has received ample illustration by the researches of Prof. Hallier upon the fungi attendant upon the exanthemata.

In the hottest period of summer, when the liver is excited to unusual activity, cases presenting many of the features of the Texas disease in cattle are not infrequent in man. They present the same fatty degeneration and box-wood discoloration of the liver, the hemorrhages into the stomach and intestines, albumenuria and fatty degeneration of the kidneys, intense jaundice, yellow grumous, but usually scanty biliary secretion, high fever, softening of the spleen; all these characteristics without the suspicion of yellow fever infection. In some of these causes disorder of the liver is the only recognizable cause of a train of symptoms ending in black vomit and death; in others, Bright's disease of the kidneys is the basis upon which these symptoms are engrafted. In these cases and in yellow fever, an acute cholaemia or admixture of bile with the blood is the most decided of all the pathological phenomena. The group of symptoms and lesions in the Texas disease is therefore well established, and corresponds to the action of a not unusual combination of causes, as well as to that of the yellow fever miasm. The application of the term *yellow fever* to the Texas disease of cattle, is warranted both by its pathological characteristics, and by the source of the contagion. From examination of the liver of yellow fever, I am confident that the same injection of the biliary radicles would be found as in the Texas disease, could the liver of the former be obtained under the same conditions that revealed that structure in the latter.

The pathological alteration in the liver of yellow fever is not a fatty degeneration merely, as is often asserted. The box-wood color can be derived from the biliary secretion only, and the liver of the Texas disease, and that of yellow fever, present precisely the same appearance when examined a number of hours after death. The yellow coloration in the Texas disease is undoubtedly due to an admixture of blood with the bile at its source, or to a superabundance of haematoidine from broken down blood corpuscles in that secretion, and such may be considered the cause of the peculiar yellow coloration in whatever disease it may be found.

DESCRIPTION OF PLATES OF MICROSCOPIC ANATOMY.

PLATE No. 1. *a, a*, Normal blood discs. *b, b*, Shriveled and crenated blood-corpuscles of the diseased blood. *c, c*, Flocculi from liquor sanguinis. *d*, A crystal of cholesterine (?) from serum. (1,000 diameters.)

PLATE No. 2. Bile. *a, a*, Yellow granular flocculi of bile. *b*, A cast of a branch of hepatic duct. *c, c*, Crystals of haematoidine. (500 diameters.)

PLATE No. 3. Urine. *a, a*, Casts of tubuli uriniferi, consisting of coagulated blood. *b*, Element of epithelium. *c, c*, Blood discs. (500 diameters.)

PLATE No. 4. Section of the liver. (50 diameters.) *a, a*, Yellow translucent

center of acini. *b, b*, An opaque zone of mingled fatty degeneration and yellow discoloration. *c*, Capsule of Glisson between acini.

PLATE No. 4. Appearance of a fragment of liver. *a, a*, Portions of reticulum of bile ducts. *b, b*, Hepatic cells, filled with granules of fat. (400 diameters.)

PLATE No. 5. Reticulum of bile ducts within an acinus injected with the yellow tenacious bile peculiar to the disease. *a*, Reticulum. *b, b*, Hepatic cells containing globules of fat. *c*, A separate hepatic cell with its portions of reticulum. (500 diameters.)

PLATE No. 6. Liver cells several hours after death. The coloring matter has passed from the reticulum into the cells. *a*, Nuclei. *b*, Globules of fat. (1,000 diameters.)

PLATE No. 7. Kidney. *a, a*, Tubuli uriniferi of kidney (their epithelium filled with granules of fat), containing extravasated blood. *b*, Fragment of epithelium.

PLATE No. 8. Spleen cells and nuclei of splenic pulp. *a*, Normal element of nuclear epithelium. *b, b*, The same enlarged, their nuclei filled with granules of fat. *c, c*, Cells containing colored corpuscles, like blood-discs. (1,000 diameters.)

PLATE No. 9. Elements of splenic pulp during convalescence. The cells are regaining their natural size. *a, a*, Homogeneous yellow granules. *b, b*, Aggregations of the same. *c*, A muscular fiber-cell. *d*, Element of nuclear epithelium regaining its normal size. *e*, Element of epithelium filled with granules of fat. *f*, Blood discs. (1,000 diameters.)

PLATE No. 10. Micrococcus found in bile and blood. 1. Appearance in fresh bile. 2, 3 and 4. Development of No. 1 in bile. 6. A variety of cryptococcus containing crimson granules from bile. 5, 7 and 11. Development of cryptococcus planted on a slice of apple; formation of filaments. (1,500 diameters.)

PLATE No. 11. *a, a*, Cryptococcus guttulatus from intestine of rabbit. *b, b*, Development of the same when planted on a slice of apple. (1,500 diameters.)

PLATE No. 12. Development of cryptococcus from bile on a slice of apple. Penicillium. (1,500 diameters.)

PLATE No. 13. Crystals of hæmatoidine from diseased kidney—the same existed in extravasations of blood into the cellular tissue surrounding the kidney. (1,000 diameters.)

[NOTE.—The interest that has been awakened by the announcement of the first results reached in this line of investigation by Dr. Stiles, is reasonable, and the importance of the ultimate truths and results to which it relates, warrants the continuance of this investigation. The following communications which Prof. Hallier sends to us from Jena, present the first results he has reached, and fully substantiate the conclusions previously reached by Dr. Stiles. As such elements of useful knowledge grow best by accretion and criticism, none of them should be withheld from publication. The lithographed figures upon the opposite page are *fac similes* of Prof. Hallier's penciled sketches. In the course of correspondence, this renowned Mycologist of the University of Jena, Prof. Hallier, early in October last, made the following statement to us:

I scarcely know of anybody whom I might entrust with scrutinies of such importance as those mentioned in your letter. The method of cultivating these small plants, I discovered by very hard work, by a great number of researches continued through years, and now I believe myself able to discover the origin of every vegetable cell found in the human or animal body.

If you can send to me bile and blood of the infected cattle, *I hope I shall be able to find out the origin of the cryptococci or micrococci.*

With my best regards,

Most truly yours,

(Signed)

E. HALLIER.

In his second communication, Prof. Hallier writes as follows:

JENA, December 5th, 1868.

TO ELISHA HARRIS, M. D., etc., etc.:

SIR—I am very greatly indebted to you for sending to me a vial filled with bile of the infected cattle. I received it safely on the 22d of last month. I immediately examined the contents of the vial, and found two different kinds of vegetable cells.

(1.) Micrococcus (of some kind of fungus) in large masses, many of them single and globular (a), others single and long shaped (b), forming mycothrix chains (mycothrix ketten), others in a state of division (c), and sometimes forming large or small colonies (d), (micrococcus kolonin).

(2.) Cells of much larger dimensions, and of the shape of cryptococcus, or rather, intermediate between cryptococcus and arthrocooccus, most of them sprouting like true cryptococcus, but sometimes dividing and forming two equal limbs.

After this examination, I began a series of cultivations with the vegetable (micrococcus) cells.

(1.) Cultivation upon an object glass (without a covering glass). The food provided for the fungus was composed of boiled spring water, a portion of starch, sugar, and an equal portion of phosphate of ammonium (phosphorsaure ammoniak). The object glass was put into a culture apparatus (Hallier, Gährungserscheinungen, p. 13, fig. 3). In this apparatus in my room, at a temperature of 20° centigrade,* the micrococcus was in rapid augmentation on the 24th of November.†

The micrococci were swelling and forming the larger cryptococcus-like cells. In the first days of December, many of the larger cells germinated and formed long filaments with many branches, and of a brownish color.

Similar results I have obtained in other cultivations.

(2.) Cultivation on a lemon (deprived of its shell) in a similar apparatus.

The micrococcus forms large cells in the same manner as in the first cultivation (December 3d).

On many spots the micrococcus is augmenting to such a degree as to form large colonies. Near the outline of these lobular colonies the micrococci swell and become large cells of the same kind. In a few days the colonies only consist of these cryptococcus-like cells. These colonies become rather hard, and at last have a

* 68° Fahrenheit scale.—E. H.

† The second day after Prof. Hallier's reception of this specimen from New York.

diameter of 0.001 m—0.002 m. They are of a white color, and have the appearance, and, according to my opinion, even the function of a *sclerotium*. As soon as the *sclerotium* is formed, all the cells in it germinate in the same manner as the single cells. Of course, they form great masses of filaments, or rather forests of filaments, as seen in figure 7, with a *low* power of the microscope. The filaments are of the same size and shape as in the first cultivation. In the midst of the little forest they form much larger cells, or rather fruits of that kind, which I called "Schizosporangia," divided by sheets* in one, two or three directions.

As you may see by looking at these few figures (No. 8), the shape of the schizosporangia is very various. The schizosporangia have the utmost resemblance to those whose micrococcus I discovered in the blood of the glanders of horses, and also in syphilis. Only look at the figures Nos. 11, 18 and 21.†

On the upper surface of the sclerotia are forests of filaments, and these filaments never form schizosporangia, but a cladosporium fruit (see No. 9), also similar to a correspondent form of the glanders and syphilis fungus. As soon as the soil begins fermentation, the cladosporium branches alter and take the form of the same penicillium, which I met with in the syphilis exploration (Figs. 12 and 13.) It is possible that our fungus is no other than the "coniothecium syphiliticum," whose origin till now is unknown. • • • We wait for the conclusion of the different cultivations. These are:

(3.) Cultivation on the surface of a cork, disinfected by submersion in alcohol for an hour. Till now the result is the formation of the same sclerotia, and just now the cells of them begin to germinate.

(4.) Cultivation on the surface of a potato (the skin cut off). Till now only vast augmentation of the micrococci.

(5.) Cultivation in a solution of sugar and phosphate of ammonium. (The apparatus I have not yet opened.)

(6.) Cultivation on albumen of eggs, with a small portion of sugar solution. Great apparatus (Greater isolation apparatus) [Gährungserscheinungen, p. 14, Fig. 2.] This cultivation has the purpose of discovering the *brand* form (anærophytische morphe) of the fungus, and may require two months' time.

I have already succeeded in discovering three forms of the fungus:

1. Schizosporangium.
2. Ærophytic spores (ripe), mature.
3. Ærophytic spores (unripe), immature or "mold" form.

There still must be discovered three other forms:

1. The unripe form of the schizosporangia (mucor or mold).
2. The anærophytic spores (ripe).
3. The anærophytic spores (unripe), oidium form.

As soon as I succeed in getting any more results I shall write to you. I hope you still succeed in getting the same forms in your cultivations. • • •

With my best regards,

Most faithfully yours,

(Signed)

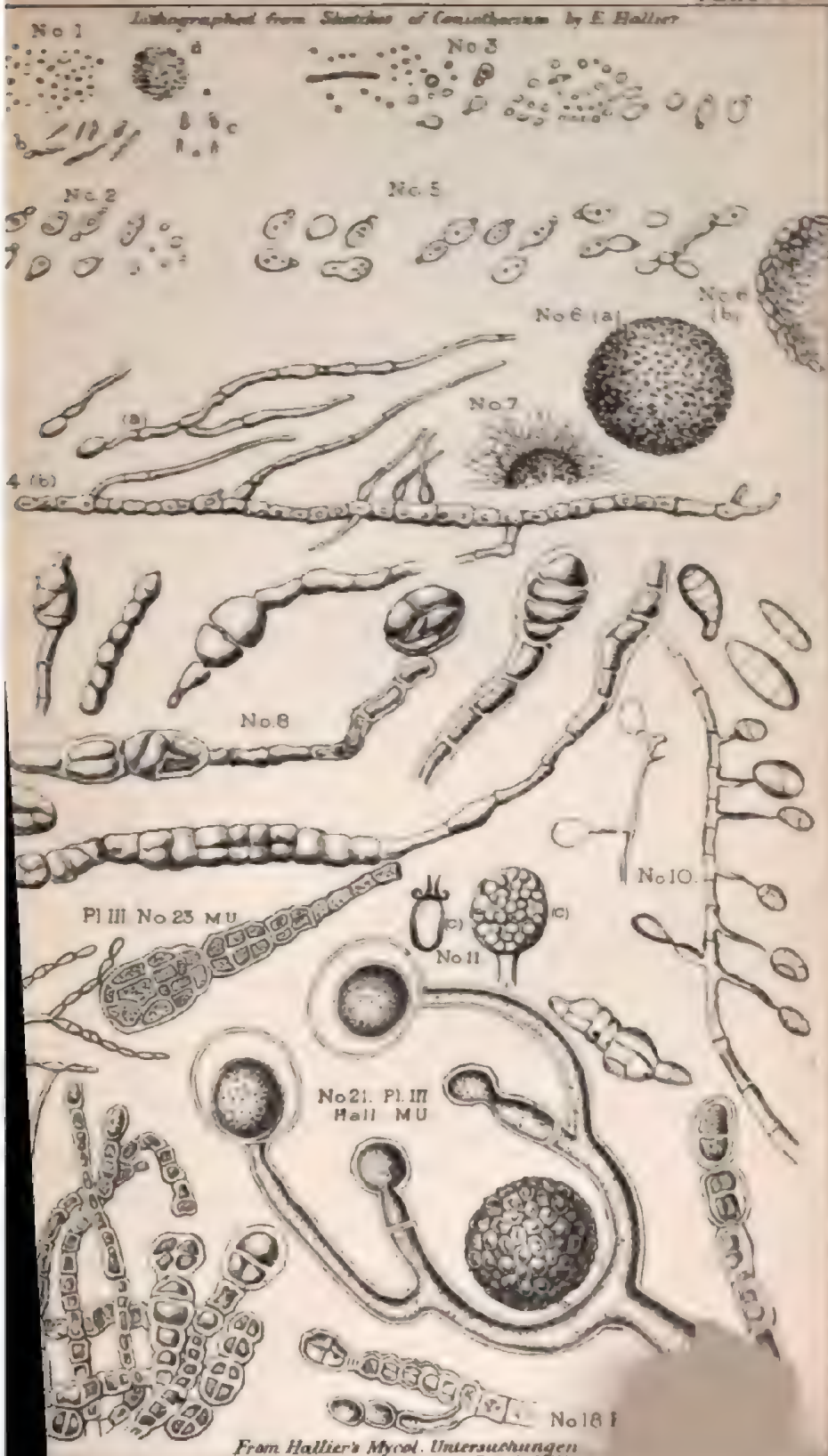
ERNST HALLIER.

Manifestly it is not a common and familiar form of *oidium* or *penicillium* that Dr. Stiles and Prof. Hallier have been studying, or they would quickly

* Partition faces.

† These numbers (11, 18 and 21), and also 23, refer to the microphyte forms derived from the horse's blood in glanders.

‡ Anærophytic form or mode.—E. H.





have recognized and named these beautiful fungi. The fact is instructive that in the cool weather of October we were able to send a specimen of the infected bile from New York to Jena, four thousand miles, without change, and with the spores alive, and evincing all the capabilities of higher development into plant-like forms.

It is not the present habit of science to depend upon hypothesis, because true knowledge patiently awaits demonstration and absolute facts; but every reader of Prof. Hallier's letter and Dr. Stiles' report concerning this parasite will not fail to remark how persistent and enduring is its own vitality. It survives and flourishes for months after being taken from the gall bladder and the blood of the infected bullock; and there is reason to believe that it would live and grow in muddy streams on various kinds of algae. It is certainly an interesting and suggestive fact that, so far as the researches of Dr. Stiles and Prof. Hallier have extended (to date of this report), the type of fungus which they have found developed from these spores is one that finds its home in the *carex*, the *lolium*, and the wheat-like or *tilletia* grasses. Whatever results may be attained in the researches now in progress, including the examination of grasses, the cultivation of the fungus upon them and in fluids, as well as the study of the development of the fungus in its several stages, will be equally interesting to herd-farmers and to hygienists. The results, whatever they may be, shall be given to the public through the proper channels. E. H.]

[NOTE.—After the manuscript for this report had been delivered to the Board of Health and arranged for the printer, the following communication was received January 11th from Prof. Hallier:

JENA, December 18th, 1868.

DEAR SIR—To-day I can give you the results of my cultivations of the fungus which you sent to me. As I mentioned in my last letter to you, the fungus of which the micrococci and the cryptococcus-like cells take their origin, is a species of the genus *coniothecium*. This form of *coniothecium* is the true *brand* form (*anærophytische morphe*) of the fungus, growing only in the interior of the strata, or at least not under the influence of the open air. You get it best by cultivating the bile on a lemon deprived of the exterior portion of the pericarpium.

The germinating cells of the fungus form, on most parts of the lemon covering, the penicillium form of which resembles very much the *penicillium syphiliticum*. On the dryer spots of the lemon you will see filthy masses of a dark greenish color. If you put these masses upon the object-glass, and put a drop of caustic potassa to it, you will very clearly see the *coniothecium* fruits surrounded by many filaments of ripe *cladosporium* with long spore chains.

Upon dry vegetable matters, like disinfected cork or potatoes, I have seen the cells of the fungus (spores) germinating in the same manner as on the lemon; but instead of the *coniothecium* (in every one of my cultivations of these spores), the filaments bore the true *schizosporangia* of which the following figures give you an idea.* The *schizosporangia* are formed on the ends of branches, not interstitial

* See Plate 33, Figs. 4 (b), 7, 12 and 13.

like the coniothecium. The fruits are of very different forms, and of a dark brown color; they are scarcely to be seen by the naked eye, but with a lens you see black spots on the cork or potato, and these spots are covered with fruit-bearing filaments. On the potato the schizosporangia occasionally do not ripen, and in this case, if the potato is moist, the unripe or mucor-form appears. (See c, c.)

Notwithstanding the great similarity of the coniothecium syphiliticum and the species here described, they are entirely different. I tried to cultivate the syphilis fungus at the same time (on the same days that I was cultivating the spores from diseased cattle), and upon the same substances, but never got the schizosporangia under the same circumstances as those observed in the cultivation of the fungus from the infected cattle in America. Our coniothecium from the bile of the infected animals was unknown till now, and for this reason, allow me to give it the name of Coniothecium Stilesianum, in honor of the first discoverer of the parasite vegetable-cells in the blood and bile of the infected cattle.

Of this coniothecium, we have now succeeded in getting all the ripe (mature) and unripe (immature) forms.

- | | |
|---|--|
| 1. Type-form (anaerophytic spores) }
[ripe] Coniothecium Stilesianum.* }
[unripe] Oidium-like filaments.† } | 2. Schizosporangia (Septosporium, according to the ancient system) Mucor Coniothecii Stilesiani. |
|---|--|
3. Aerophytic form: [ripe], Cladosporium; [unripe], Oidium-like filaments (according to the system, Coniothecium Stilesiarium).

Perhaps you may succeed in finding out the places where this coniothecium grows in nature. At all events, it is a parasitical fungus, growing on plants, and to be looked for in the food of the wild bullocks. I began a new series of cultivations a few days ago, and if the results in any point are different from the first cultivations, I shall write to you another time about this matter. With my best compliments to Prof. Stiles, I remain

Most respectfully yours,

ERNST HALLIER.

DR. E. HARRIS.

* See Plate 33, Figs. 4 (b), 7, 12 and 13.

† See Plate 33, Fig. 4 (a).

VI. PROF. CHANDLER'S REPORT UPON HIS CHEMICAL INVESTIGATIONS.

SCHOOL OF MINES, COLUMBIA COLLEGE, }
NEW YORK, *December 1st, 1868.* }

TO E. HARRIS, M. D. :

Dear Sir—I have the honor to report, herewith, the results of my investigation of the blood, bile, etc., of diseased cattle, which you have sent to me from time to time. The analyses are as accurate as can be expected of such complex and putrescent fluids, during the warm summer months. The first samples spoiled on our hands, so that the analyses could not be completed.

I avail myself of this opportunity to call your attention to the valuable services of my assistants, Dr. Paul Schwitzer, Mr. F. A. Cairns and M. D. Wheeler, Jr., A. M., E. M., who have been my co-laborers in this investigation.

Respectfully yours,

C. F. CHANDLER, *Ph. D.*

TABULATED RESULTS OF THE CHEMICAL ANALYSIS OF BLOOD OF BULLOCKS. BY PROF. CHAMBERLAIN

DATE.	SPECIAL RECORD OF THE BULLOCKS.	Water.	Solids.	Fibrin.	Red Cor- puscles.	Albu- men.	Fat.	Haemato- crit.	Ratio.	Total.
(1) August 17	Convalescent of J. T. Alexander's; killed on the 8th day of convalescence; had been sick longest and most severely of any of the 6 convalescents.	854.0	134.1	10.00	41.0	08.0	4.00	7.0	0.0	992.0
August... 26	Convalescent 15 or 16 days; from Mr. Alexander's herd, Comumipaw	810.3	183.7	3.43	08.3	50.8	0.80	14.0	0.7	1000.0
August... 30	Blood from a cervical vein taken 4 days before slaughter from Mr. Fyles' herd	807.2	142.8	0.00	50.7	03.8	.....	19.4	0.0	1000.0
August... 30	Second specimen from same animal	804.7	135.3	7.22	50.1	03.0	.....	7.0	0.0	1001.4
August... 30	From infected bullock at rendering dock	800.9	111.1	0.00	.....	.....	.....	12.0	0.1	1000.0
September 4	Blood taken at slaughter of No. 3, above; spec-imen from the aorta	852.1	147.0	5.50	60.7	04.0	3.10	0.0	0.8	1000.0
September 9	Bright & Fagan's III. herd; killed in last stage	849.6	150.5	13.10	7.8	130.0	1.00	1.3	0.3	1000.0
September 9	Bright & Fagan's III. herd; killed in last stage	810.8	180.2	01.30	.....	170.7	.....	0.3	11.0	1000.0
September 11	Bright & Fagan's Illinois herd; slaughtered in last stage; temperature in centre of liver, 108°	870.0	123.1	7.80	13.0	00.8	0.00	20.2	14.1	1000.0
September 13	From "Fah-Kee" herd; killed in last stage; fat	784.0	216.0	7.60	22.4	188.0	1.50	8.6	8.0	1000.0
September 14	B. & F. III. herd; killed in last stage; temp. 108°	809.1	100.0	2.18	42.8	00.2	8.00	10.0	0.7	1000.0
September 26	Steer from D. Adler's III. herd; killed in last stage	816.7	183.3	0.00	97.3	05.1	.....	5.3	7.8	1001.6
October... 11	Mr. Richardson's ox; Lafayette, Ind.; see pl. 23	809.1	100.0	8.27	.....	109.8	.....	4.0	0.0	1000.0
October... 18	Abandoned from Illinois herd; killed in last stage	870.1	129.0	7.44	50.2	50.2	.....	4.7	0.1	1003.7
ANALYSIS OF THE BLOOD OF THREE HEALTHY BULLOCKS, BY THE SAME METHOD AND THE SAME CHEMIST										
December 18	Bullock from Connecticut; fat	770.25	220.75	0.47	100.14	02.00	.....	4.23	8.01	1000.0
December 19	Bullock from Connecticut; very large	787.82	212.18	8.64	114.70	73.84	.....	0.02	8.08	1000.0
December 20	Bullock from Kentucky; fat	770.06	220.94	4.39	110.50	00.02	.....	3.02	7.01	1000.0

* Putrid before it could be weighed.

SERUM FROM ABDOMINAL CAVITY.

DATE.	Water.	Solids.	Fibrin.	Blood Cor- puscles	Albu- men.	Fat.	Extract- ive mat- ter.	Salts.	Total.
Aug. 30	940.8	50.2	7.7	.....	40.6	.....	3.1	7.8	1000.0
Sept. 4	943.8	36.2	.....	.....	27.9	.....	5.9	2.0	1000.0
Sept. 9	787.7	229.9	10.7	21.9	157.6	0.6	.....	39.1	1007.6
Oct. 11	815.6	184.4	9.3	.....	168.6	.....	4.4	7.4	1005.4

THE BILE.

DATE.	Water.	Solids.	Specific gravity.	Fats.	Mucus.	Cholates etc.	Salts.	Total.
August 26	928.7	71.3	.....	2.15	6.37	62.8	.....	1000
Sept... 4	941.9	58.1	.....	2.44	1.51	54.1	.....	1000
Sept... 4	920.2	79.8	.....	.....	.....	.....	11.40	1000
Sept... 9	915.5	80.5	.....	3.16	11.10	66.2	.....	1000
Sept... 11	944.8	55.2	1016.0	.....	.....	.....	9.66	1000
Sept... 14	886.9	113.1	.....	1.04	17.03	94.9	.....	1000
Sept... 25	865.4	134.6	1030.5	.....	.....	.....	14.70	1000
October 1	883.5	116.5	1043.4	.....	.....	.....	13.10	1000
October 12	842.1	157.9	1053.6	.....	.....	.....	13.70	1000

THE URINE.

DATE.	Water.	Solids.	Specific gravity.	Albu- men.	Salts.	Bile.	Reaction.	Total.
.....	.....	.....	1028.0	none	.....	none	.....	1000
Sept... 9	932.5	67.5	1027.0	42.90	5.9	none	alkaline	1000
Sept... 11	974.5	25.5	1014.0	7.90	2.7	none	alkaline	1000
Oct... 11	953.5	46.5	1030.1	0.06	0.7	none	.....	1000

THE LIVER.

DATE.	Water.	Solids.	Fats.	Salts.	Total.	Remarks.
October 11	740.5	259.5	62.5	41.1	1000	.....
October 11	766.8	233.2	66.1	.....	1000	Large lobe.
October 11	773.1	226.9	90.1	.....	1000	Small lobe.
October 23	707.1	292.9	88.6	.....	1000	.....

VII. TITLES AND DESCRIPTION OF PLATES.

PLATE I.

Appearance of animals in the acute or obvious stage of the Texas cattle disease.

Fig. 1. Showing the feeble animal supporting himself by locking his horns in a fence; back arched, hind legs wide apart, throwing the weight of the body forward, tail retracted, and ears drooping.

Figs. 2 and 3. Showing the drooping head, protruded tongue, arched back and yielding hind-quarters.

Fig. 4. The fallen animal in the last stages of the disease preventing himself from rolling on his side, by twisting his head spasmodically in the opposite direction.

PLATE II.

Carcaas of a bullock in the last stage of the Texas cattle disease laid open, in order to show the color of the muscular and adipose tissues. [This is a sketch of one of Mr. Thomas' herd from Indiana.]

PLATE III.

Sections of mucous membrane of abomasum, showing ulceration and intense congestion.

Fig. 1. Pyloric portion of abomasum showing erosions of the surface covered with blood, blackened by the action of the secretions of the stomach.

Fig. 2. Section of a folding portion of another rennet stomach, showing a more chronic ulceration, and a higher grade of surrounding inflammation.

Fig. 3. Folding portion of abomasum showing chronic erosions and intense congestion.

These three figures are taken from Texas cattle.

PLATE IV.

Omasum and abomasum showing slight congestion of the layers of the former, and intense inflammation of the folds of the latter.

a, Omasum; *b*, layers or maniplies; *c*, abomasum; *d*, small intestine.

PLATE V.

Pyloric portion of abomasum, and commencement of small intestine, showing inflammation and ulceration of mucous membrane of the former.

PLATE VI.

Sections of pyloric portion of abomasum, showing congestion and ulceration.

PLATE VII.

The fourth stomach, showing congestion and deep blackened erosions.

PLATE VIII.

Accidental ulcer of upper lip and portion of rectum.

Fig. 1. *a*, Ulcer of upper lip; *b, b*, rami of lower jaw.

Fig. 2. a, Mucous membrane of rectum, its longitudinal folds inflamed and covered with minute extravasations; *b*, *b*, adipose tissue.

PLATE IX.

Mucous membrane of caecum and sections of abomasum showing hypertrophy of the follicles.

Fig. 1. Mucous membrane of caecum, presenting patches and striations of congestion and extravasation of blood.

Figs. 2 and 3. Sections of mucous membrane of folds of abomasum showing the closed follicles enlarged and prominent on a surface of congestion.

PLATE X.

Bladder everted, mucous membrane covered with petechiae and extravasations. *a*, Urethral portion inflamed and oedematous; *b*, fundus marked by deeper congestion and larger extravasations.

PLATE XI.

Sections of inflamed duodenum and rectum.

Fig. 1. Mucous membrane of duodenum intensely congested and oedematous.

Fig. 2. Mucous membrane of rectum intensely inflamed, its longitudinal rugae oedematous commencing gangrene.

PLATE XII.

Sections of mucous membrane of abomasum inflamed, and recovering from sloughs, &c.

Fig. 1. Mucous membrane inflamed and covered with blood that has been extravasated upon the surface, and blackened by the gastric secretions.

Fig. 2. Mucous membrane of abomasum of a Texan highly inflamed, the edges of its folds sloughed and thickened.

PLATE XIII.

Pyloric portion of abomasum showing extensive slough.

PLATE XIV.

Sections of mucous membrane of ileum, showing congestion of longitudinal and transverse folds.

PLATE XV.

Mucous membrane of omasum, abomasum and bladder; intense congestion and petechial extravasation.

Fig. 1. Mucous membrane of omasum, with ecchymosis and papillary projections.

Figs. 2, 3 and 4. Mucous membrane of small intestine reddened by congestion.

Fig. 5. Bladder in miniature, showing petechiae on a ground of diffused congestion and extravasation. *a*, Urethra.

Fig. 6. Mucous membrane of No. 5, on natural scale, appearance of petechiae.

PLATE XVI.

Posterior surface of liver and gall bladder (reduced in size), showing distended gall bladder.

PLATE XVII.

Appearance of enlarged and distorted liver; diaphragmatic surface (weight 23 pounds).

a, Section showing color of parenchyma immediately upon being cut.

PLATE XVIII.

Spleen entire, reduced, and sections.

Fig. 1. Spleen (reduced) showing the mottled greenish color of the peritoneal surface.

Fig. 2. Section of spleen (natural scale) and actual appearance of the surface.

Fig. 3. Portion of spleen of another animal, showing congestion of capsule, and gashed to show the pulp.

PLATE XIX.

Kidney laid open, in order to disclose the interior congestion and discoloration, and showing cortical portion, tubular portion, and pelvis with surrounding fat; all these parts blackened and intense congestion.

PLATE XX.

Kidneys entire (reduced) in different stages of congestion.

Fig. 1. Same animal as Plate XVII.

PLATE XXI.

Section of pyloric portion of abomasum, several weeks convalescent, and of rectum, showing congestion and ulceration.

PLATE XXII.

A congested and ulcerated abomasum.

PLATE XXIII.

Sections of skin, liver and spleen.

Fig. 1. Portion of skin shaved, in order to show its jaundiced hue.

Fig. 2. Fragment of liver showing color of surface, and the ramifications of the distended biliary ducts.

Fig. 3. Portion of spleen showing congestion of superficial blood vessels and coloration of parenchyma.

Plates illustrating the microscopical researches, seven in number, already described. Plate XXXII illustrates Prof. Hallier's study of the fungus parasite of the blood and bile in the cattle disease.

VIII. WITH WHAT WELL DESCRIBED DISEASES IS THIS TEXAS CATTLE DISEASE ALLIED?

Having alluded to the fact that the first groups of the diseased animals that arrived at the Metropolitan herd-yards exhibited symptoms which led us to believe that the malady perhaps belonged to the broad of contagious known as *anthrax* fevers, some pains have been taken to inquire carefully into its chief points of resemblance and difference, compared with those fevers, and with the milzbrand and kindred disorders which prevail on the continent of Europe.

The very first dissections that were made clearly demonstrated that it was not the intestinal typhus, for the small intestines were in no cases marked by any of the lesions of typhoid enteritis which is prevalent in the lowlands of Holland, Belgium and Hungary. Considered in regard to all the phenomena and pathological changes noticed in the first two groups of diseased cattle, this disease seemed to require a description that had hitherto not been given in any treatise on epizootics. From the Western newspapers the fact was learned that Prof. Gamgee and others regarded it as similar to the "darn" of Aberdeenshire. Prof. Liautard, with whom we frequently conferred during the autumn, did not attempt to give any name to the disease. The same was true of Prof. James Law, the accomplished professor of veterinary science at the Cornell University, Ithaca, N. Y., whose attendance we had the good fortune to secure at one of the last post-mortem examinations made at the National drove yards, One Hundredth street. The latter gentleman has, with characteristic thoughtfulness, kindly forwarded to us the subjoined communication relating to the points we are here examining:

• • • • • •

The "darn" as seen by us in Great Britain [Prof. Law is a native of Scotland] is usually a very mild affection. Its cause is agreed on all hands to be the ingestion of irritant, resinous and astringent plants, as its common names—in England, *wood-evil*; in Germany, *holzkrankheit*; and in France, *maladie de bois*—would indicate. The symptoms are those of intestinal irritation, the colicky pains being often severe, with constipation; the feces, if passed, being coated with mucus or even blood, and in bad cases forming a tarry mass evidently due to altered and effused blood. The urine, red or black, contains large quantities of blood-coloring matter and albumen.

If seen in the early stages, measures directed to the obtaining of free evacuations from the bowels are almost always followed by a speedy restoration to health, so that I have never seen a fatal case.

It is worthy of note, that it often prevails on the same lands with the *anthrax* or *carbuncular* affections, and appears then to be complicated by this disease, or modified by a similar cause. Röhl, of Vienna, says there will sometimes appear "a gelatinous exudation into the sub-cutaneous areolar tissue, and extravasation beneath the serous membranes, showing a complication with anthrax. The malady

begins with the appearance of gastro-enteritis, accompanied by renal irritation, scanty, red or bloody urine, great sensibility of the loins and intense fever, mucous and bloody faeces, foetid and bitter milk, with not unfrequently spasms or convulsions. The complication with splenic apoplexy (*milzbrand*) is seen, and may be shown by swelling and emphysema on the surface of the body."

Hering and others speak in analogous terms, indicating its close connection with the anthrax affections, though whether only as a complication or a full development of the original affection, is open to question. Our English form rarely assumes this aggravated type, and seems quite wanting in the malignant properties of carbuncular fevers, having, moreover, no specific virus like these latter. I ought to add, however, that in those European cases that prove so fatal, the autopsy shows points of resemblance to the Texas fever. Hering says there is "inflammation and petechial patches in the stomach and intestines, the ingesta is dried, the mucous membrane œdematous, the liver and spleen enlarged, sometimes even to rupture; the gall bladder distended, the kidneys contracted, a turbid effusion in the thorax, inflammation and petechiæ in the pulmonary organs, and a jelly-like effusion into the cellular tissue."

The accounts, however, are too meagre, and as you will notice, the means available in the present day have not been brought into requisition in the case of these diseases, so as to furnish data sufficiently numerous and accurate for purposes of comparison.

I have already mentioned to you the general similarity of the Texas fever and the *carbuncular fevers* of Europe. I mentioned that one great distinguishing feature of the former was the absence of bacteria in the blood, though as these have been found in the blood of animals suffering from influenza and other affections, attended with a typhus diathesis, their presence is probably not an essential condition of the disease. What leads me to make special reference to this again, is the statement by *Davaino*, in his communication read before the *Académie de Médecine* (July 27th, 1860), that in addition to bacteria, the blood of anthrax patients contained special globular elements. "Globules, of a peculiar kind, are sometimes found; they are regularly rounded off, and larger than the normal white globules, of which they have the appearance. They are united in small clusters in great abundance, and are composed of an outer cell of a bulbous appearance, reflecting in some a violet tint. In the center of this cell there are found several nuclei, the double outline of which is well marked. In some, these nuclei have degenerated into the sandy or granulous form, peculiar to the nuclei which are produced by *fission*, so that evidently we have under our eye an alteration of the elements, *which are in a fair way of multiplication*."

This spore cell production I had altogether overlooked; but now the question arises: May not this be the same microphyte as you have so admirably shown in the blood of *Texas fever*, or, what would probably amount to much the same thing, a fungus, which demands much the same condition of blood for its development? The want of any testimony to its presence in the bile, and the ignorance concerning the special action of the bile in breaking up the blood globules, affords no presumptive evidence of the non-existence of these conditions, since the presumption is that *no test was applied*.

In contagious properties, again, they agree in some remarkable points. The carbuncular fevers are inoculable, and usually contagious, but the contagium is rarely or never conveyed through any other medium than the blood, tissues and discharges of the diseased animals—rarely showing what the French call a *vicius volatilis*—and evidently requiring some, not well defined conditions, for its trans-

mission; hence, in many cases—indeed, the majority of cases in Great Britain—it gives no evidence of a *contagium* unless inoculation is resorted to. • • •

With much esteem,

Yours very faithfully,

JAMES LAW.

(Signed)

To E. HARRIS, M. D., *Metropolitan Board of Health*.

Plainly enough, it will be easy for European medical observers of milz-brand, and the whole group of anthracoid diseases of cattle, to ascertain whether these destructive maladies which they witness are or are not similar to the Texas Cattle Disease. Prof. Virchow, of Berlin, Dr. William Budd, of Bristol, and the ablest pathologists in Europe, think they are able to trace a direct relation between the carbuncular or anthracoid fevers of domestic cattle and the malignant pustule in man. Such a relation is now admitted to be the source of this terrible fatal malady. But in reference to the Texas cattle disease, the fact seems well established that it does not produce malignant pustule, and that while it corresponds with the destructive epizootic fevers which Professor Law has carefully described in the foregoing letter, it nevertheless seems to differ in some essential points from them. It is highly desirable that all the anthracic or carbuncular fevers should be studied with the same care and exactness as the Texas fever. Professor Law's statements concerning the actual analogy between the milz-brand, of Europe, and the Texas fever, are eminently suggestive; and we feel greatly obliged to that learned writer for this valuable contribution from his pen. It may yet be found that the marshes of Hungary and the swamps of the Vistula occasionally produce a disease quite similar to the Texas cattle fever.

IX. FACTS AND DEMONSTRATIONS ADDED TO PHYSIOLOGICAL AND PATHOLOGICAL KNOWLEDGE.

FIRST.—*The demonstration of the rapid dissolution of the red blood globules in the last stage of the disease and immediately after death.* This was plainly true in the first cases examined by Dr. Stiles; and on the 10th of August, he remarked that after the blood, flowing from the carotids of infected bullocks, had stood for a few hours in stoppered vials, scarcely a trace of blood-globules could be found, excepting such broken and shrivelled as he has described in the first plate of his microscopy of the blood. And, while experimenting with a solution of the morbid bile from the same diseased bullocks, Dr. Stiles noticed the fact that the red globules of the blood were swept into solution almost as suddenly as snow flakes would be when falling into water.

SECOND.—*Facts connected with the ultimate reticulum of biliary ducts and the morbid changes in the liver and bile.* The discovery that was made by Dr. Stiles (when working in the field with the microscope, on the 13th of August), of the reticulated structure and distribution of the ultimate biliary ducts of the liver, not only added a fact of great interest and importance in progressive physiological knowledge, but this discovery was from the first associated with pathological conditions, the later studies and better understanding of which have led to comprehensive, exact and highly important practical conclusions in regard to symptoms and pathological changes which had hitherto been most important, but at the same time most difficult, if not impossible, to understand. We refer to the mechanical and pathological conditions which in this disease manifestly produce cholæmia, and to certain demonstrations here alluded to concerning the morbid condition and destructive effects of the bile as witnessed in this disease. The studies which Frerichs and other high authorities have given to this class of facts without such means of demonstrations, have been corroborated and placed upon a more definite practical footing by the results of these researches.

THIRD.—*The demonstration of consecutive pathological changes, and of their relations to the fatal result.* No other pestilential or febrile disease, whether epidemic or epizootic, has furnished to medical observers such a complete and consecutive series of demonstrations of the steps by which disease progresses from its incubative beginnings to perilous and destructive changes in tissues and proximate elements to obvious symptoms and exclusive phenomena, until death terminates the pathological record of events. Considered with reference to the progress of medical knowledge and hygienic measures, in regard to epizootics and enzootics, as well as in regard to epidemics and certain of the spreading pestilences that depend upon contingent circumstances that hitherto have not been well demonstrated, the results reached in these investigations may justly be regarded as in the highest

degree encouraging and instructive. The successful study of the essential morbid changes that occur during the progress of this disease in the blood, the bile, the liver, the most vascular and constricted portion of the stomach and the spleen, and lastly, the explosive phenomena, the destruction of the blood corpuscles, the waste of blood elements of the kidneys, and the morbid alterations that occur in those organs, and in conclusion, the phenomena and circumstances of death, together with that impressive and truth-telling signet which the damaged and broken blood corpuscles leave in the tissues, cavities and fluids into which the spoiled and stagnant blood has oozed and left crystals of hæmatoidine, singly, and in this association, constitute such a series of consecutive and well coördinated events in the disease as rarely has rewarded the toil of medical researches.* And notwithstanding more remains to be learned than all that hitherto has been demonstrated, it is certain that some substantial progress has been made in that kind of knowledge by which the mysteries of transportable pestilences will ere long be unmasked and exterminated or effectually controlled. And when we consider that, had it been a human pestilence, this disease could not have been studied in this manner without violating the common sentiment of regard for the dying and the dead, the medical men who pursue such investigations upon the food-animals, may justly claim that by such studies as these they confer a three-fold benefit upon mankind; for in addition to the protection of human foods and myriads of valuable cattle, a correct and controlling knowledge of human pestilences is promoted, as it could be in no other way.

FOURTH.—*The re-demonstration of the same law of ground-incubation, or development of a contagium deposited upon the soil from the bowels.* This very important law or truth concerning certain infective principles or substances was first demonstrated by Prof. Pettenkofer, of Munich; and the demonstration, as the Metropolitan Board of Health very well knows, related to the propagating principle of the Asiatic cholera. Dr. Wm. Budd and Dr. Snow, in England, practically taught this doctrine, without full demonstrations, at the same time that Pettenkofer was tracing out the complete evidence upon which this law is now founded. As in regard to the infective cause of cholera, so in regard to the Texas Cattle Disease, the bowels of the living, and in some instances apparently healthy, individual carrier of the pestilential germs, may evacuate—with excrement, those germs so completely developed that they may at once begin the fatal and incubative work of infecting other individuals; or, on the other hand, the germ development in such excrement may be so incomplete or immature

* The scientific papers of Dr. Thudichum in the Ninth and Tenth Annual Reports of the Privy Council (1887 and 1888), show that these researches into the nature and causes of morbid changes in the blood are of the very highest practical importance to the medical officer in dealing with the sources of preventable disease. Dr. Thudichum remarks that "the study of many diseases requires an intimate knowledge of the constitution of the blood corpuscles." He states, also, that "the hæmato-crystalline is the last ingredient of the blood which undergoes putrefaction; its stability is the main fact in the stability of life."

("midge," as Prof. Haller says of the antherophytic spores), that the surface of the soil, or the herbage on which the excrement is dropped, must serve as the nursery and "incubator" for nourishing them into the advanced or infective and poisonous stage of development, the "ripe" state. Prof. Haller, before the blood and tissues of the exposed and healthy individuals can become infected. In the present state of advancing demonstrations in regard to the pestiferous contagion of cholera, this would scarcely be regarded as theoretical language, much less does it now seem to be merely theoretical in regard to the Texas Cattle Disease. Upon this subject we need only refer to the abstract of correspondence and of authenticated evidence in preceding sections of this report. In the States of Illinois and Indiana, the proofs upon this point concerning the incubation or maturing of the excrement contagium during an interval of greater or less duration after it was dropped upon the ground, are so abundant and convincing, that many of the farmers seized upon the logical interpretation of their own peculiar experience and cases, and emphatically though somewhat rudely gave expression to this wonderful yet now easily understood doctrine, that Pettenkofer demonstrated when analyzing the history of cholera in Bavaria in the autumn of 1848. A vast quantity of evidence (experience and record) relating to this anomalous habit of the infective cause of the Texas Cattle Disease, is constantly coming into our hands, and it will in due time be analyzed and the results made public.

FIFTH—And in elucidating important physiological and pathological questions connected with yellow fever. While summing up and analyzing the results of these investigations concerning the "Texas Cattle Disease," we have been deeply interested in the contribution which these results make to practical knowledge of some of the most essential questions that have, in the past fifteen years, been started by physicians in the study of yellow fever. The compiler of this report having witnessed and professionally examined several hundred cases of this pestilence, and made dissections of nearly one hundred persons that died of it, was prepared to notice the points at which the results of the present investigations apply to the questions that have arisen in the study of yellow fever. In regard to these questions we will here notice the following points:

In 1853, Prof. Alonzo Clark, of New York, discovered and described the characteristics of the fatty change and the peculiar coloration that occur in the liver in cases of yellow fever. He also described the nature and cause of the strange coloration which characterizes the liver in malignant remittent fever. Dr. T. H. Bache and Dr. Stewardson, of Philadelphia, made similar researches and reached similar results. The microscopical investigations by Dr. Lyon in the last epidemic of yellow fever in Lisbon, and similar studies by Dr. S. Fleet Speir, of Brooklyn, confirmed the medical opinion of the profession that the most constant of any of the anatomical changes in the latter malady, is found in the liver, and in a certain kind of coloration which attends the malady as a resultant of the dissolution of

blood globules. Whoever peruses this report, should, if possible, read the Prize Essay [of Dr. Speir in the Transactions of the American Medical Association (vol. xv, 1864)], and consult the letter from Prof. Clark in the first volume of Dr. La Roche, on yellow fever, and the report on yellow fever in Lisbon in 1858, by Dr. Robert Lyon. These distinguished pathologists found that the pestilential destruction of blood globules, the presence of the resulting *hæmatodine*, or of hæmatine, from which it is derived, and the acute fatty change in the ultimate structure of the liver, are the most essential pathological events in that malady. But the opportunity for studying the structural (morphological) alterations in the liver, the blood, the spleen and the kidneys in fatal cases of yellow fever, have not given the facilities for precision in results of microscopical inquiry (because not made in every stage of the disease and of convalescence, and before any post-mortem change was possible) which have been afforded by the infected cattle for the examination of these vital structures. And it is one of the rewards of the latter class of labors that they elucidate and verify the chief deductions that have been made by the learned physicians whose researches in yellow fever are here mentioned.

In concluding this brief note upon the aid given to clearer demonstrations in pathology by these investigations, we would not omit to notice the very instructive researches of the late Dr. Daniel Blair, chief medical officer of the British military establishment in Demerara; for when he died in the midst of great efforts to discover the true cause of yellow fever, sanitary science lost its most ardent inquirer into the natural causes of this pestilence. The latest of his observations were so directly in the line of the demonstrations that have resulted from Dr. Stiles' investigations that we mention them in this place. Truly scientific physicians are jealous only for the truth; and it will be noticed that Dr. Blair reached the verge of that important discovery which Dr. Stiles has made in regard to the actual ultimate [structure of the biliary system. It was in a living patient in his hospital, and in some vomited bilious and bloody matter which Dr. Blair believed contained by chance some particles from the diseased liver cells that had floated into the duodenum and into the stomach with the bile. In April, 1856, Dr. Blair wrote to his friend, Dr. John Davy, of London, as follows concerning his microscopical examination of that fancied and but barely possible presence of debris of the liver:

It (nitric acid, upon a certain specimen) enabled me to trace some of the tubules into the *centre of the specimen*; still more important, it enabled me to detect within them liver-cells, with their minute oil globules. * * * I think there can be little doubt that these tubules are the *radical secreting ducts of the liver*. May not these observations throw some light upon what I believe is still an undecided point in anatomy, viz., the precise manner in which the radicals originate in the lobules? To me, what I have seen seems a demonstration of the induction of Kiernan on this point.

Dr. Blair was describing a substance that his patient had ejected with

some bile or vomit, and this observation came near being buried with its author. It was not a demonstration; nor would a thousand such observations have been a worthy basis for belief or assertion; but it has value as an observation, that we mention this fact here, because it belongs to the record of a most important discovery and actual demonstration of essential facts in the anatomy and pathology of the liver, and particularly because this curious observation by Dr. Blair shows how difficult and obscure was the kind of knowledge which he sought by the bed of the dying and in the corpse of dead of yellow fever. (For a fuller account of Dr. Blair's latest observations, see his letters appended to the April and July numbers of the *Medico-Chirurgical Review*, 1856.)

X. CONCLUSIONS.

The field in which the investigations have been commenced is too large to admit of final conclusions upon *all* the points of inquiry, in so brief a period, for analyzing the results of so numerous and varied an assemblage of facts. Our deductions, therefore, must be regarded rather as landmarks and soundings, than as boundary lines, upon the shore of great truths. The conclusions that appear best established have important relations to practical questions in hygiene and to the interests of herd farmers.

FIRST.—*The nature and pathological effects of the disease in beef cattle.* The investigations prove that the disease is caused by a slowly incubating poison which operates in a fatal way upon the blood, and which also produces important structural alterations in the essential organization of the liver, the spleen and the kidneys.

SECOND.—*The precise nature of the diseased structural alterations.* The blood suffers an impairment, and, in the fatal stage, an almost entire destruction of its most vital portion—the red globules. It also suffers in its natural quality and richness by the loss of albumen through the kidneys, and by other very serious kinds of impairment which are not yet understood, but which result in actual destruction of the blood as a living element of the animal system. This spoliation and death of the blood (*necræmia*) appears to be complete. No disease or poison known to medical men has ever presented a more striking example of an incubating blood poison (*toxæmia*), and an ultimate termination by *necræmia* or death of the blood.

The *anatomical lesions*, or structural alterations in the liver, are unquestionably the first in the order of beginning, and of relationship and importance. The particular kind of morbid conditions in the secreting and circulatory organism of the liver would inevitably contribute to the gradual and final destruction of the blood, and also would induce the morbid changes that are observed in the spleen. Physiological principles seem fully to account for the engorgement, erosion and sloughing which occur in the tubular portion of the fourth stomach or abomasum. The spleen, in its engorged, diseased condition, would necessarily aid in producing the stomach lesion (erosion and sloughing) by its own failure to furnish outlet and relief to the engorgement of the vessels of mucous membrane of the rennet, and it could contribute in several ways to hasten the final dissolution of the blood. The engorgement and the acute fatty degeneration or change noticed in the kidneys is one of the chief causes of the rapid waste of albumen from the blood; but the disease may, and not unfrequently does, go on to a fatal termination without being attended by any considerable amount of disease or change in the kidneys. The lesions or changes that have been observed in the other tissues and organs of the infected animals seem to be merely results of blood changes and impaired vitality. Those lesions which are merely incidental to the really essential changes in the blood and in the liver and spleen may,

nevertheless, be recognized as aids in diagnosis of the disease in certain cases. They are, therefore, worthy of attention and description, such as we have attempted to give in several of the illustrations given in this report.

THIRD.—*The parasite that is found in the blood and bile of infected cattle.* Whether we regard it as a propagating and destructive cause of the disease, or simply as a concomitant, it is necessarily an important attribute of the pathological or destructive agency that operates upon the blood. The prolific brooding and growth of the fungus (*micrococcus*) is wholly dependent upon the living elements of the blood for its "soil and food" to grow upon. But the real significance and value of the results that have been reached in the researches upon this collateral element of the inquiry into the disease, promise much for practical hygiene as well as for herd farming; for such complete demonstration will lead to a kind of absolute knowledge that is much needed concerning the pestilential epidemics, as well as the destructive epizootics, and will lead to their *entire prevention*.

FOURTH.—*The unfitness of the dying and the infected cattle for human food.* If this question is raised by any persons, or on behalf of any commercial interest, it should at once be answered in general terms that both the animals that are dying, and those that have lingered under the operation of the infection until the blood and viscera are diseased, are unfit for food. Practically the human stomach can overcome most of the immediately poisonous effects of diseased flesh and animal juices used as food; but experience and teachings of physiology and hygiene unite in pronouncing unfit for food all the cattle that reach the fatal stage of the "Texas Cattle Disease," and all that have incubated the infection until the blood and tissues exhibit the morbid alterations which that poison produces. And as regards *certain freshly arrived Texas cattle* that are suffering the disease (as we now diagnose it by the *post-mortem* evidences in them when slaughtered, and by emaciation, feebleness, and their indescribably offensive breath and effluvium while living), we can best express the conclusion that has been reached by the more precise kind of investigation, without here mentioning the details of evidence on this subject, by simply quoting the remark of an educated observer of the Texas Cattle Disease in western Missouri. He says: "Who would knowingly eat the beef of cattle with such a pestiferous breath as these sick Texas cattle have? It can be no favor to the consumers of beef to have that article cheapened in the market by the introduction of animals of such very doubtful, not to say injurious, character." In plain words, cattle while suffering either from the chronic or the acute type of this disease ought to be withheld from the meat markets.

FIFTH.—*The period or term of incubation.* The term of incubation or latent development of the fever poison in the second or northern groups of cattle that receive the infection, is clearly proved to be a period of variable duration, and that it varies from fourteen to thirty or forty days; but that, in the majority of instances, the full incubation and development of the dis-

case is accomplished in about twenty days.* High temperature manifestly hastens the development of the disease, and the hunger, thirst and excitement of railway transportation aggravates it. But that, even where the cattle become infected in good pasture, and under circumstances that are favorable to the best health, the incubation is certain and destructive; and that with such conditions it requires four weeks, less or more, to bring the malady forward to its stage of obvious symptoms and death.

SIXTH.—*The susceptibility of different kinds of cattle.* The fact seems well established that well bred and full fleshed cattle are extremely susceptible to the operation of the contagium, and that in them its highest rate of mortality is produced. The fact is also indisputable that in the herds that have the misfortune to bring the disease or *contagium* from Texas, only a small percentage become fatally sick; but in such herds many that do not die of the disease linger many weeks in an emaciated and diseased condition.

SEVENTH.—*Acclimatization and insusceptibility to the cause of the disease.* This kind of security seems to be enjoyed only by cattle that have been bred or pastured south of the Osage and Arkansas rivers; but whether this partial security against the malady is due to the peculiarities of wild cattle, or to a gradually acquired physiological power to resist the fatal operation of the primary cause of the disease while grazing at its very sources, does not appear to be proved.

EIGHTH.—*Is the disease due to crowding and abuse of cattle?* Plainly, it does not *originate* from such causes; but there is evidence that the Texas cattle that are crowded upon the "boiler deck" of the Mississippi steamboats, and subjected to thirst and fasting on the voyage up the river, have thus far been themselves the greatest sufferers by disease, and have proved to be the most frequent carriers of the cause which last summer destroyed native herds in Illinois and Indiana.

NINTH.—*Susceptibility of other animals than those of the bovine species to the disease.* The fact seems to be well established that several kinds of herbivorous animals do suffer and die from the disease.

TENTH.—*Is the disease of cryptogamic origin?* With the amount and kind of evidence now in our possession, it seems probable that this malady owes its origin to a species of fungus parasite which has now been demon-

* This is a little more than four times the average and usual period of incubation of yellow fever in man. The troops that continued to be sent from France to the port of Vera Cruz during the recent occupation of Mexico by the French, were attacked by yellow fever under such exact conditions and periods of exposure by medical observation at the times of their arrival in port, that the medical officers had no difficulty in reaching the conclusion that the period of incubation of the infection (contagium) "was never less than forty-eight hours, and seldom more than four days." (Surgeon M. Croullebois on *Epidemic Yellow Fever at Vera Cruz* in 1863. *Recueil de Mémoires de Médecine, de Chirurgie et de Pharmacie Militaire*, Paris, December, 1868.) This result of observations by the French military surgeons accords with observations upon the same pestilence in the harbor quarantine hospitals at New York, with this exception: that in *this latitude* we find that the period of incubation ranges from three to seven days, and that in cool weather the incubation term is longer than in very hot weather.

strated to infest infected cattle ; and that this conclusion rests upon other and much stronger reasons than that such a parasite simply is found in the blood and bile. It also seems highly probable that the actual *contagium*, or means by which the disease is repropagated by cattle, will ultimately be demonstrated to depend upon this minute spore-growth (*micrococci* matter, of Professor Hallier), which is found in the diseased cattle and upon the higher stages of the development when deposited with the excremental droppings upon the soil, etc. And, that ultimately it may, and probably will be discovered, that the native habitat and source of this parasite is in limited districts of country south of Missouri, Kansas and Arkansas ; and that it is a parasite of the indigenous herbage of those districts. Upon all these points the evidence is cumulative, harmonious and logical ; yet, in the more advanced state of knowledge concerning the causation of this and other infectious diseases, it may be found that this or some other essential attribute of the disease and the *contagium* is only an essential factor, the presence of which, with other morbid and unhealthful conditions, insures the production and fatal operations of the malady. Finally, in regard to this exact kind of discrimination concerning the nature and destructive operation of the propagating cause of pestilential diseases, the facts that have been demonstrated concerning the Texas cattle disease add very largely to a kind of knowledge which is of the highest importance to sanitary science and its protective applications in the human family and to the useful animals which the Creator has given to man.

E. HARRIS.

REPORT UPON THE RESULTS OF A SPECIAL SANITARY INSPECTION OF BEEF CATTLE AT THE TIME OF SLAUGHTER IN NEW YORK AND BROOKLYN.

By MORREAU MORRIS, M. D.

E. B. DALTON, M. D., *Sanitary Supt. Metropolitan Board of Health:*

Sir—Until recently every avenue by which cattle for our markets arrived seemed under control. Suspected and infected herds, however, began to find their way into the various drove yards. Several distinct lots of cattle with disease among them had passed the cordon which had been established, both at remote points as well as along our immediate fronts, notwithstanding some small herds has been seized and quarantined. A high priced market had stimulated the cupidity of greedy speculators, so that condemned herds, which had been turned out to graze around Chicago and other points, were purchased and forced at all hazards upon our markets. These facts proved the statement made some time before, of what might be expected, and they also enable us to explain what actually occurred upon the steamer *Fah Koo* on the 12th Sept. inst. Here were a herd of forty cattle selected for the Bermuda market at the National Drove Yards, One Hundredth street, at the time of purchase apparently healthy, but some of which certainly were infected with the "Texas Cattle Disease."

These animals (as a cattle dealer expressed it) "were bought by telegraph and rushed through by steam" from Chicago in five days. Some of them being infected and others probably sick with this disease, the hardships endured from the deprivation of rest, food and water, together with a very oppressive atmospheric condition, occurring just at that time, but too surely developed a sudden and fatal attack. Post-mortem examinations of the seventeen (17) dead out of a herd of forty (40) purchased for shipment proved, beyond all question, that the current statements of "death from overheating and smothering alone" was but a fallacy.

True and unmistakable evidences of the convalescent conditions pertaining to the "Texas Cattle Disease" were found in several that survived. These cattle were certainly victims of speculative cupidity, and could the loss but fall upon those most guilty, who in this manner really traffic and trifle with human life, it would be a partial but just punishment.

These instances now made it necessary to ascertain the condition of cattle being slaughtered for immediate consumption in our own cities; and upon these representations, together with other pertinent facts, an investigation was immediately ordered at the various butcheries throughout the city. Eleven gentlemen—Sanitary Inspectors Drs. Janes and Lee of New York, Drs. Fisk, Thayer and Colton of Brooklyn, and Assistant Inspectors Drs.

Howard, Strang, White, Wadsworth and Randall, and myself—officers of your Board were detailed for this special duty. These gentlemen reported for duty immediately upon being summoned, and, it may be here remarked, have pursued their investigations with more than ordinary zeal, intelligence and faithfulness.

The results of that combined investigation are of exceeding importance, and developed the fact that two important questions are involved with reference to it:

1st. Were sick and dying cattle, infected with the "Texas Cattle Disease," being slaughtered in our small butcheries?

2d. Are other animals not affected by this disease really in a healthy condition, and what morbid conditions are found requiring sanitary attention?

The judgment upon the first question to be taken, upon the discovery of those evidences of the destructive effects that had been established during the investigation of the disease, as it appeared in animals sick and dead of it, both here and in the west. The conditions as presented by the liver, spleen, blood, gall, urine, fat and muscle *in a unity*, pronounce "the disease."

The second question, though not pertinent to this disease directly, is yet equally important for the information of the Board, in considering questions of sanitary necessity.

In pursuing this investigation, the question naturally arises, what are the lesions found in the acute and fatal cases of the "Texas Cattle Disease?"

These in general terms are an enlarged fatty liver, enlarged and engorged spleen, peculiar condition of blood, a thick, dark-colored flaky bile, containing disintegrated blood, a dark colored urine, containing hematine, fat of a dark greenish or brownish yellow hue, and a dark mahogany red-colored muscle. The animal having these characteristics, in life, presents externally the following general appearances: The head is carried low down, ears drooping, the eye is dull, generally staring in expression, somewhat bulged from its socket, the hairy coat is rough, standing out from the skin, having lost the glossy appearance of high health, the spine somewhat arched, the gait is weak, particularly that of the posterior quarters, causing a staggering motion; the temperature of the body both externally and internally increased, reaching a point as high as 110 deg. Fahrenheit in some extreme cases. As the animal becomes convalescent all these external symptoms disappear, the temperature decreases gradually to the normal standard, and but a few days intervene from a severe attack before it becomes impossible to determine with perfect accuracy that any disease is yet present.

An examination of internal organs presents now the only evidences of existing disease. Thus it happens that sick animals may escape the critical eye, even of an expert, without detection, unless other circumstances lead to a suspicion of disease. Hence it is that animals do and will reach the shambles, which are in a convalescent stage.

Of this class, a marked example has come under our observation during this investigation. Ninety-four (94) Texan cattle which had undoubted evidences of this fever, and which through inadvertence had been forwarded too soon, were carefully examined at slaughter, and evidences of former and present disease found positive. These cattle had passed three inspections since their arrival, and had it not been for the anxiety to elucidate certain scientific questions in the investigations now in progress of this disease among Texan cattle, the diseased condition might still have been undiscovered. Other morbid conditions found in some slaughtered animals, while they do not conflict with the evidences of "Texas Cattle Disease," yet present such evidences of ill treatment and abuse during their transportation from the grazing pastures to our markets, in the symptoms of acute gastritis found in the fourth stomach, caused by long abstinence from food and water, that your Board cannot but feel called upon to cause such measures to be taken as shall put a stop to this cruelty, and thereby present to the consumer a more healthful article of diet. This one branch of the food question requires the utmost scrutiny, and the records of vital statistics will continue to show the large death-rate until a better supervision is maintained over the various kinds and qualities of food now presented in our markets.

Extracts from the reports of the Inspectors will present the results as found during their inspections:

Dr. Randall reports of "thirty-five beef cattle he saw slaughtered; thirty-three presented inflamed and eroded conditions of the fourth stomach in different stages or degrees; four were intense; one of these four before slaughter looked sickly, although a fine large animal. The viscera did not present a healthy appearance; liver large, about eighteen pounds in weight, softened; spleen rather larger than normal; kidneys darker than natural; urine apparently healthy; bile flaky and ropy; fourth stomach intensely inflamed, with large ulcerations in different stages, some having cicatrized, the surrounding tissue much thickened; rectum presented a large, dark, bloody ulcer, and was highly congested upon its inner surface. The meat of this animal was darker than usual."

Assistant Inspector Strang reports by arranging his investigations into three classes; the third class containing three, which presented the following described features:

"The abomasum or fourth stomach of one presented as many as twelve ulcers, variously situated, from one-eighth to one inch in their greater diameter; the rectum congested on the margins of the rugæ of the mucous membrane." In another case the fourth stomach presented the same kind of ulcers, but of larger average size, some of which were healing. Liver weighed more than thirteen pounds, and was fatty; bile, viscid.

Inspector Janes reports:

"That the most of his time was occupied in examining the internal organs of ninety-four 'Texan cattle' recently arrived, they having reached Illinois from Texas in the early part of the past summer, and having been slaughtered without the usual delay of being wintered during one season at the north. This report must be confined to what was revealed to the unaided eye, consisting principally

in what were found to be the conditions of the abomasums and the spleens. The former (the fourth stomachs), without exception, revealed evidences of having been extensively diseased, as shown by numerous cicatrices or erosions in the process of healing, covering the whole mucous surface of the pyloric extremity, as well as its broader portion and folds; also a general hyperæmic condition of the mucous membrane.

"The spleens were invariably enlarged to twice the size of those from healthy native stock, as was found by testing the weight of each. Some of the livers were fatty and somewhat enlarged. Assistant Inspector Howard writes from his inspection of some of the same animals: 'I witnessed the slaughter of eight or nine Texas cattle, said to have formed part of the original herd from which the "cattle disease" was first derived and communicated to the native herds subsequently found in eastern markets.'"

I would here mention, in passing, that Dr. Howard had seen almost all of the post-mortem examinations of the cattle that had died or been slaughtered, having this Texas Cattle Disease, during the past few weeks, as it has been presented to us in the native cattle. He remarks:

"The result of my post-mortem examinations is important, showing:

1st. That the original Texas herds had been themselves at one time diseased, notwithstanding the current report that they communicated the disease while they themselves were exempt from its ravages.

2d. That the lesions observed in the Texas cattle were the same as those found in our native herds, said to be affected with the cattle disease, and that as nearly as possible the disease in each case is the same.

3d. That some of the lesions found in the Texas cattle examined, were as extensive and exhibited as much or more evidences of past inflammatory and destructive action than other cattle did of present disease, previously examined, when killed for scientific investigation.

These Texan cattle appeared to the general observer to have perfectly recovered from the disease."

In reply to the second question, viz: Are animals not affected by this disease, really in a healthy condition, and what morbid conditions are found requiring sanitary attention, all the Inspectors afford abundant evidence in their reports in answer to this question.

Inspector Colton, of Brooklyn, reports in his summary as follows:

"Thus of twenty-one (21) examined, twenty (20) showed evidences of present disease. The only lesions apparent, except in one case, where the liver appeared fatty though not enlarged, being an ulcerated condition of the mucous membrane of the fourth stomach, both on the folds and the pyloric extremities, though more constant on the former than the latter, which ulcerations were shown in all stages of their history; the ulcer in its active condition, in its chronic stage, when the reparative process had commenced, was considerably advanced, or had reached completion, the part could no longer be spoken of, of course, as ulcerated."

Inspector Thayer, of Brooklyn, says:

"The results of my examination have been so uniform that I can speak of the cattle almost as one lot. Thirty-six animals have been examined, in all of which

I found none of the lesions to which attention has been called, except in the fourth stomach. This organ exhibited the evidences of ulceration in twenty-three animals out of thirty-six in a state of healing, or of indolence, or already cicatrized.

"The ulcers were mostly along the free edges of the deep folds of this stomach. There were also cicatrices near the pylorus in many cases and enlarged isolated follicles. All the livers were seen, and most of the spleens. Three livers were a little larger than normal and somewhat mottled with yellow, but not fatty. The remainder and the spleens were normal. The bile and urine were seen in half the animals, and always found in normal condition. Kidneys normal, of those seen. The fat was of healthy color, but half the animals were thin. The chief result of my investigations has been to discover none of the evidences of present disease, but considerable of disease past, confined chiefly to ulceration of the fourth stomach."

Inspector Fisk, of Brooklyn, reports the following lesions in one:

Third stomach or "book" margin of folds dry. Fourth stomach marked with eroded patches and dotted with cicatrices; black lines of erosion along edges of folds. Liver engorged and fatty; bile dark; spleen apparently normal. Rectum bloody along the longitudinal folds, fat of greenish yellow color. Of twelve others examined six were in a healthy condition, the remaining six exhibited the following lesions:

In four cases the third stomach or "book," margin of folds dry.

In six cases fourth stomach marked with erosions and dotted with ulcerations.

In three cases liver engorged and fatty, bile dark and ropy.

In two cases spleen enlarged.

In two cases kidneys engorged with blood.

In two cases urine dark colored.

In three cases rectum bloody along longitudinal folds.

In two cases fat unnaturally yellow.

During these investigations 290 head of cattle were seen slaughtered at the various butcheries, and the viscera of many others were carefully examined which had been removed from animals slaughtered during the day, previous to the presence of the Inspector.

Under the head of Question 1st. Were sick and dying animals of the Texas Cattle Disease being slaughtered in our small butcheries, it is shown by the data furnished by these Inspectors that of the whole number (290) examined at slaughter a certain per cent disclosed positive evidences of the lesions, some in the acute and others in the convalescent stages, pertaining specially to the Texas Cattle Disease, in the various viscera and fluids of the body.

Under the second question, Are other animals not affected with this disease really in a healthy condition, and what morbid conditions are found requiring sanitary attention? it was found that of the whole number, 142 presented evidences of acute and chronic forms of gastric disease, thus giving a total of 236 diseased and unhealthy animals out of 290, which were examined at the time of slaughter during three days.

They likewise report having examined the viscera of a large number of animals slaughtered on the same days, but before the hour of their visit, which presented evidences of disease in some form. Two other Inspectors,

Lee and Demainville, report that in the slaughter-houses they visited, where quite a number were seen killed by them, no evidences of disease were discovered in any of the viscera.

From these data and results of a hurried and imperfect examination of the viscera of animals, both at the time of slaughter and after it had been completed, when only parts of each animal could be seen, these prominent facts appear :

That Texas animals suffering and convalescent from the so-called Texas Cattle Disease, and that animals suffering from other diseases, the result of cruelties practiced upon them during transportation by the greedy cupidity of speculators, who thereby not only traffic on the miseries of the brute creation, but are regardless of the health and lives of their fellow-beings, are slaughtered and disposed of for human consumption. Such practices call loudly for prompt and decisive interference by constituted authorities, and were all the facts known to the general public that are now known to those engaged directly or indirectly in the movement of cattle for markets, no language would be deemed too severe with which to scourge the guilty parties.

It seems to be a question settled in the minds of all observers, now investigating the more minute pathology of this Texas Cattle Disease, that the use of such beef as food is and must be injurious and pernicious to the human system, as it has proved to be in the system of some of the lower animals that have been fed upon it. That ill effects are produced by the consumption of diseased beef cannot be doubted, yet such beef will be eaten unwittingly until a better quality can be secured for food supply. A thorough system of inspection and control, from the grazing pastures to the retail markets, is the only safeguard. This necessity calls imperatively for Legislative and sanitary interference, without which the public health is constantly endangered by the practices now engaged in by unscrupulous dealers.

Until the severe frosts of winter arrest the development of the germs of poison in infected herds, entire public confidence cannot be assured, and only such means as now applied, by inspection of all animals arriving, on foot and after slaughter, can be relied upon as safeguards.

Respectfully submitted,

MOREAU MORRIS, M. D.,

Sanitary Inspector Met'n Board of Health.

NEW YORK, September 22d, 1868.

“G.”

A REPORT ON VACCINATION,

IN REPLY TO A

Letter from Drs. Whitney and Carnochan, to the Metropolitan Board of Health.

To the Hon. Metropolitan Board of Health, City of New York:

Gentlemen—From the announcement in the daily papers, it appears that vaccinations in the public schools have been discontinued until such time as your honorable body shall be able to secure the co-operation of the Board of Education, in some definite arrangements for carrying into effect an appropriate and judicious plan for the general vaccination of the children attending the different schools in the Metropolitan district.

In this movement all are personally interested, either as parents, relatives or children; and thus the entire community become involved in the effects of a general vaccination whatever be its character;—We, therefore, residents of the city, and members of the Medical profession, deeply interested in the welfare of our common schools, would respectfully represent that there are some evils unnecessarily attached to the present mode pursued for perpetuating vaccinations, which ought, in any plan that may be devised, to be carefully avoided; and we beg the privilege of referring to some of these and suggesting the means by which they may be overcome.

For this purpose the primary requisite is good, healthful, vaccine virus which can at this season be easily obtained direct and fresh from the Kine. This is a very important consideration and should not be overlooked; for there is the clearest and fullest evidence that this vaccine lymph, or crust from the Kine, furnishes the best and most certain protection and immunity from the contagion of Small Pox.

It is, however, a lamentable fact that much is improperly collected from unworthy and questionable sources, and sold under the name of vaccine virus, which is impure and comparatively worthless. Vaccine virus of this questionable character does, no doubt, find its way into common use in this city, and even in the country, as most of that used in the country is obtained here. Hence the general objection to vaccination on account of the vitiated character of the virus, through which, it is believed, various forms of scrofula, and other constitutional or malignant diseases are too frequently intro-

duced into families, who, prior to this process, were entirely free from such taint or development. Hence, too, the frequent failure and the great want of confidence among the people in it as a preventive of Small Pox. Impure and worthless matter does generally, when used, produce a very bad sore and often inflicts injuries in a variety of ways without adding or furnishing to the system one particle of protection.

Cases of unmitigated variola are frequently occurring in vaccinated subjects, indicating a radical defect in the performance of the operation and consequently in the impression intended to be conveyed and made decidedly upon the system, by the ingrafted disease "vaccinia." From recent developments a large proportion of vaccinations for the twenty-five years last past may be considered spurious, and may, should the disease variola spread over the country in an epidemic form, prove ineffectual and unprotective, to the sad disappointment of vast numbers who now think themselves perfectly safe.

Of this, the evidence is constantly being forced upon us, despite our efforts to conceal it. Such is the nature and character of the testimony that we need select only a few items out of the multitude before us which go to show that these objections are not altogether untenable. It is not many years since a gentleman took the disease Small Pox, without being exposed in any way, to his knowledge, and communicated it to all his family save one. Two of the four cases were genuine Small Pox. The others were varioloid. All these had been previously vaccinated and had every reason to believe they were perfectly secure and safe. In the case of the two younger, it was supposed they were impervious to the contagion, as they had been re-vaccinated only a few months before;—yet one took the disease and had the genuine Small Pox, while the other taking the disease from the same source had varioloid.

In another family four out of five had the disease; three of there were well defined and decided cases of Small Pox. All but one had been vaccinated and adjudged to be perfectly safe, and certainly protected against contagion.

In another there were three, all of which were decided and severe cases of the genuine disease. These were supposed thoroughly protected by vaccination and at least shielded for the time from any impression of contagion, but like many others were sadly mistaken.

Cases of re-vaccination in our public schools show a record, so far as the facts are known to us, but little, if any, more favorable.

These are not solitary cases—nor were they among the dregs of society, but occurred in the higher walks of life. Many similar cases might be cited, all going to show the deterioration and worthless character of the vaccine virus that has been, and still may be, in use for aught that is known to the contrary.

Had these families been properly vaccinated with pure fresh virus, direct from the Kine, the acknowledged source of the Kine Pox, they would in all probability have escaped the odium of this disease. So frequently, however,

are such cases occurring in subjects who have been vaccinated and again re-vaccinated not only in the army and navy and in some sections of our country recently suffering from this fearful malady, but even in our midst and under our own observation, that it becomes exceedingly important for us all to inquire whether we are protected or not. A mistake on this point may be fatal.

In all those cases where vaccination was improperly performed by the use of an impure, tainted or otherwise vitiated virus—or from any other cause rendering the vaccinia spurious and unprotective, it would be the safer and better course for such, if they would render their protection reliable, to be properly re-vaccinated from pure fresh virus derived direct through the usual process from the Kine. This we know to be reliable and permanent in its protective power. But how far its transmission from one person to another may be carried without deterioration and detriment we will not pretend to say, but let facts decide.

"An eminent surgeon of Naples," says the *London Lancet*, "M. Palasciano, introduced and carried out a plan of conveying the vaccine virus from heifer to heifer, so as constantly to have a supply of lymph direct from the cow. At the Congress of Lyons, two years ago, M. Palasciano brought these facts before the meeting, and the innovation was looked upon as a feature of considerable interest. At that period, Dr. Lanoix, a medical man practising in Paris, thought that, for various reasons, the capital of France should have facilities for vaccinating from the cow, in preference to the usual modes of conveying children's virus by glasses, points, tubes, or from arm to arm. In fact it was thought an advantage that the vaccine lymph should not pass through the human organism, as the lymph would thus be fresher, and the taint which certain children might attach to it would thus be avoided. Dr. Lanoix communicated his plan to M. Depaul, and to the Director General of Paris Hospitals, M. Husson. Both these high functionaries encouraged the project; and Dr. Lanoix proceeded to Naples to study, under M. Palasciano, animal vaccination.

"M. Husson states that in the Hospitals of Paris in fifteen months, 9,316 vaccinations and re-vaccinations were performed by means of Dr. Lanoix's heifers led into the various hospitals. Of these 1,392 were men, 2,457 women, and 5,449 children. The operations were, as is usually the case, successful in a very limited number of re-vaccinations, varying from sixteen to seventeen per cent; with children, however, the successful cases were about fifty per cent. M. Depaul's experiments extended from the 12th of April to the end of December, 1866."

Of the interesting report on this subject made to the French Academy of Medicine, says the *Lancet*, it "is very long, extremely minute, of great lucidity, and is decidedly in favor of animal vaccinations." One remarkable fact appears further on in the body of this report, worthy the notice and consideration of every physician and surgeon. It is presented in the following words: "From the trials carefully made it becomes evident that the syphilis is not transmissible to the bovine species." In confirmation of this, refer-

ence may be made to the report of the committee at Florence, Drs. Ricordi and Dell'Acqua, who were appointed to ascertain the fact, and satisfactorily settle the question, whether the disease termed syphilis was transmissible to the Kine or not; and after several months labor and a thorough investigation of the whole subject, give their answer emphatically in the negative: "Not less than twenty-one distinct experiments were made, and the final result was, as stated above, that the noisome disease in question is not transmissible to animals" (of the bovine species).

Hence it may be inferred that the vaccine virus, taken direct and fresh from the Kine, is perfectly free from this taint and other forms of scrofula with which it coalesces. It is also evident from their reports that the experiments made have fully established the fact that the best course for the safety and protection of the community is to return to Dr. Jenner's original proposition—to the use of pure, fresh virus from the Kine only, which he affirmed to be perfectly reliable and permanent in its protective power.

Let this course be pursued, and all our children regularly vaccinated at an early age with pure virus from the Kine, and the variola or Small Pox would soon be banished from among us, nevermore to return and prevail in an epidemic form.

In a city so large and populous as New York, it is exceedingly desirable and important that this course be carried into effect, and, if necessary for the purpose, that there should be an institution established for obtaining and collecting the pure vaccine virus solely and only from the Kine, and for furnishing the same on all occasions for ordinary use in the community, as well as for vaccinating the children attending our public schools in this city and vicinity. Such an institution is greatly needed, or at least the means and facilities for providing pure and unadulterated virus in sufficient quantity to answer all demands that may be made for the same. This would be a vast improvement upon the present practice, and would effectually prevent the spread of scrofula and other appalling forms of disease through the medium of vaccination. It would also remove many of the evils now complained of as resulting from impure, tainted or vitiated virus. Through the operations of such an institution it is absolutely certain that no syphilis, scrofula, or other human taint or impurity can possibly be transmitted by it.

It is well known, cases not unfrequently occur in practice where the arm becomes badly swollen, highly inflamed, and exceedingly distressing, showing a malignant character utterly unlike the normal condition of a vaccine sore. How can this distressing result be accounted for, if it be not from the transmission of some unexpected malignant disease which, in its development, becomes more violent and controlling than the vaccinia, thus rendering its influence upon the system unprotected and useless? Many have had occasion to deplore this result, and have earnestly sought some practicable way to avoid it without changing the process of procuring the lymph from the arm. But here lies the evil which ought to be corrected to prevent disastrous results in practice. To mar the beauty and undermine the constitution

of a healthful child is no trifling error in the process of vaccination; yet from tainted and impure virus this result does sometimes occur. The evil is quite too prevalent, and cannot be ignored.

To advise and admit the use of impure and tainted virus, and cause the same to be inserted into the arm of an innocent child by a compulsory process without the consent of parent or guardian, is, to say the least, assuming a fearful responsibility, which savors too much of a reckless disregard of the health and happiness of the rising generation to be tolerated in an enlightened community. From such a course success cannot be expected. The rights, duties and responsibilities of parents and guardians are too well defined and too continuously protected to be invaded from any source without cause.

We do, therefore, earnestly pray your honorable body to abate the flagrant wrong being perpetrated upon innocent children, and utterly prevent its continuance any longer, by inhibiting the use of impure and vitiated virus; that no physician, surgeon, or other person, be allowed, under any circumstances, to employ such material in the process of vaccination, in our public schools, or in any family; that children be vaccinated at an early age under the supervision and direction of their parents and guardians; that all necessary provision be made as suggested above, for the early adoption of the better and more rational practice of "animal vaccinations," through which no human taint or impurity can possibly be transmitted; and also, that whatever arrangement, plan, ordinance, or legislation may be had, made and adopted, it may embrace every essential feature of the subject under consideration, effectually remove the errors and evils now existing, and place the responsibility of spurious vaccination where it properly belongs.

Such are, in brief, some of the facts and arguments touching the matter in question, all of which are respectfully submitted.

Very respectfully, yours, etc.,

A. B. WHITNEY, M. D.,

J. M. CARNOCHAN, M. D.

Resolutions of the Eclectic Medical Society of the City of New York.

At the regular monthly meeting of this Society, held Wednesday evening, Dec. 18th, the following resolutions were passed:

Resolved, That in the opinion of this Society, no persons except the parents or guardians of the children, have the right to direct their vaccination, and that no one should be allowed to enter our common schools and vaccinate children, without the knowledge and consent of their parents and guardians.

Resolved, That the subject of obtaining pure vaccine direct from the Kine, is one of very great importance, as matter thus obtained will prevent the spread of a variety of diseases, such as scrofula, syphilis, etc., which almost universally follow the use of impure matter.

Resolved, That this Society respectfully recommend to the Metropolitan Board of Health, of the city of New York, that they establish a system for obtaining pure

virus direct from the Kine, and in such quantity as will supply every possible demand.

Resolved, That a copy of these resolutions be forwarded to the Board of Health, and the Board of Education, of the city of New York.

PAUL W. ALLEN, M. D., *Secretary*.

ELIJAH WHITNEY, M. D., *President*.

Letter of the Sanitary Committee of the Metropolitan Board of Health to Dr. J. P. LOINES, Vaccine Physician.

NEW YORK, Feb. 15th, 1868.

J. P. LOINES, M. D., *Vaccine Physician, etc.*

Dear Sir—The Board of Health has received the inclosed communication from Drs. Carnochan and Whitney, and from the Eclectic Medical Society of the State of New York.

They remonstrate, in the first place, with the Board, for tyrannically compelling the children in the Public Schools to be vaccinated by their Inspectors, &c. This allegation is wholly incorrect. The Board of Health does not vaccinate any one. All that it undertakes to do is to inspect the cicatrices on the children to ascertain if they present evidences of good vaccination, and if the marks are equivocal, to require that the children should be re-vaccinated, where and by whom the parents and guardians should deem best. This denial is a sufficient reply to the charge, but we wish to invite your special attention to the other assertions made in these communications.

They characterize a large part of the vaccinations for the last twenty-five years as not preventive against the Small Pox, and performed with impure and tainted matter obtained from human arms, productive of scrofula, syphilis and many other injurious diseases. They therefore recommend the Board of Health to prohibit the use of human, and employ only bovine, virus. This, they say, can be easily enough obtained, and in sufficient quantity to vaccinate and re-vaccinate all, and thus not only prevent Small Pox for life, but also the spread of a variety of diseases such as scrofula, syphilis, &c.

In the past history of the Small Pox we know that one hundred years before the introduction of vaccination into Great Britain the mortality from Small Pox alone reached 30,000 a year, and if computed upon the present population would reach 100,000 a year, and if the same ratio should prevail in the other countries of the civilized world, there would have reached a mortality of more than a million a year from Small Pox alone.

Vaccination, in our opinion, is the greatest physical gift of God to man. If more carefully applied it would exterminate the Small Pox altogether.

The allegations so broadly made in the communications referred to are not accompanied by satisfactory proof, or with data sufficient upon which to build an argument, yet being made by physicians who occupy positions of influence in the community require serious examination.

No one can be justified in proclaiming thus unqualifiedly their hostility

to vaccination, unless they have fully examined the subject, and presented the reasons for their opinions in detail. because public confidence once shaken in the efficacy of vaccination will surely result in re-introducing the dreadful plague of Small Pox, which formerly threatened to depopulate the world.

The Sanitary Committee are desirous of obtaining the results of your experience, because they know that you have devoted many years to the study of this subject, have vaccinated more than any one else in the city, and are generally acknowledged to be the best authority in the country.

Be pleased to give us your opinion upon the matters alluded to in the communications, as well as answer specifically the following questions :

1. How long have you given particular attention to vaccination ?
2. How many have you vaccinated, and with what average success ?
3. How many of those have since taken the Small Pox ?
4. In how many has struma, syphilis, or other diseases been caused by vaccination ?
5. What are the signs of the perfect progress of the genuine vaccine disease, and the best method of vaccination ?
6. State whether syphilis, or other diseases or troubles might be produced by vaccination, and, if so, whether they can always be easily avoided or not ?
7. Are you familiar with the subject of bovine virus, if so, state what you know of it ?
8. Is this virus equally prophylactic with the humanized against Small Pox ? If so, would bad results from using it be better avoided than from the human vaccine ?
9. Does any or do both kinds of vaccine virus weaken by transmission from one system to another, for a great length of time ?
10. Is re-vaccination necessary, after the use of either kind ?
11. Do you regard the change to bovine vaccination as suggested, necessary or feasible ?
12. Is the vaccination of the Dispensary physicians, upon which the poor depend, as good as possible ?
13. What is your opinion of the cases cited and of the evidence which support the arguments against vaccination, alluded to by Drs. Carnochan and Whitney, and the Eclectic Medical Society ?
14. State what you would advise for the better protection of the community against Small Pox.

Very respectfully yours,

JOHN O. STONE,
WILLARD PARKER,
JAMES CRANE.

Sanitary Committee of Metropolitan Board of Health.

A Reply to the Questions of the Sanitary Committee of the Metropolitan Board of Health, upon Vaccination, by J. P. LOINES, M. D., Vaccine Physician to the Eastern Dispensary, and to the Quarantine Establishment of the Port of New York.

TO Drs. J. O. STONE, WILLARD PARKER and JAMES CRANE,
Sanitary Committee, Metropolitan Board of Health:

Gentlemen—On account of the importance of your implied object of promoting the better protection of this community against Small Pox, I could wish that some other person may be found more capable of justly treating the subject than myself; yet I consider it my duty to give the results of the study and practice of the specialty of vaccination to which I have now been devoted nearly eighteen years.

My first experience was the charge of vaccinating about fifty infants on Blackwell's Island, during my term of service in 1849 as physician to the Alms House at that place; my first virus was then obtained from Dr. J. V. C. Smith, editor of the Medical and Surgical Journal, and at that time vaccine physician of Boston. He advertised it at the rate of ten points for a dollar. I mention this from the singular fact that such a quantity as I desired could not be obtained at that date in New York city. I there studied the phenomena of vaccine daily, and began to record the "pedigree" of the "virus," which account I have still continued with more than 110,000 infants. I might say that I have been incidentally compelled to study the nature of variola as well as other eruptive fevers and diseases, particularly syphilis. I have also been familiar with the subject of vaccine from the cow for more than ten years, and have experimented with it in vaccinating as often as twice a year for the past eight years.

But according to your request, I will now proceed to answer the questions as they may arise in reviewing the statements or assertions of the letter of Drs. Carnochan and Whitney. It commences by referring to vaccination in the schools, and remarks that there are some evils unnecessarily attached to the present mode, which ought to be avoided, such as the spread of syphilis, Scrofula, etc., and it suggests the use of good, healthful vaccine, which, it says, can at this season be easily obtained direct and fresh from the Kine; it goes on to the conclusion, that this vaccine not only furnishes the best protection against Small Pox, but can never be the means of causing injurious diseases, and therefore advocates the passage of a law making penal the use of human vaccine.

We are not informed what kind of Kine Pock vaccine "virus" is meant, whether that of first, the "variolated cow," second, "retro-vaccinated cow," that is, from the "human to bovine," or third, that which cattle communicate to each other, the origin of which is somewhat obscure. Whatever variety was referred to, however, the general objection would be the same, viz: that they have not proved, neither have any others yet shown that the bovine virus is the best protection against Small Pox, and that the occasional unpleasant sequels of vaccination can thereby be easier avoided.

Their arguments upon the propositions are two-fold; first, condemnation in strong language of the vaccination practised in this city for the past twenty-five years without any proofs of its guilt; and second, a partial statement of a one-sided review in the *London Lancet* of an *ex parte* paper read before the French Academy of Medicine. The few instances cited by them of variola after vaccination, afford no reasonable evidence upon the subject. Therefore, it is perfectly correct to say that all of the arguments in favor of "kine pox virus" were obtained from the copy of the *London Lancet*, from which the quotation is taken; but even a thorough review of that editorial shows, that if it had been fully copied, there would have been very little ground for the often repeated, confident assertions of the letter, viz: that bovine matter will soon banish Small Pox; that there is the clearest and fullest evidence that this vaccine lymph, or crust from the Kine, furnishes the best and most certain protection and immunity from the contagion of Small Pox; it is known to be reliable and permanent in its protective power; it is absolutely certain that no syphilis, scrofula, nor other constitutional or malignant diseases, nor bad sores or injuries can ever be caused by it. Thus the quotation below from the *London Lancet*, their sole authority, is one which they omit, and is near the concluding paragraph: It says that "years must elapse before it can be distinctly ascertained whether the protection obtained by cow-pox inoculations is more durable and complete than when children's lymph is used; and it would be premature to jump at a conclusion, especially as the report to the Academy distinctly states that "cow-pox inoculations are not a considerable improvement upon vaccination from children." Such an admission by the Parisian authors of the scheme, who were most interested in its success, means, as will be plainly shown, a decided failure.

This is the same conclusion to which several other physicians in this city, besides myself, arrived several years ago, after using the bovine virus; but is it not strange that after so lame a conclusion, your correspondents should base such triumphant arguments or belief as to its success? They also seek to enhance their views by declaring that the plan was "Dr. Jenner's original proposition," at the same time that their oracle, the *Lancet*, heads its article thus:

"An important modification in the manner of using Jenner's discovery, has just been put to a careful trial by M. Depaul, director of the vaccination department of the Academy of Medicine." It is well known that one great part of Dr. Jenner's discovery was his mode of perfecting the vaccine disease upon the human subject, and his showing how, with his rules, it could be thus more safely and reliably transmitted; Jenner's practice therefore differed from their version of his theory.

It may be observed incidentally, that the greatest opposition arose from the fact that he admitted its derivation from brute animals secondarily, by the name which he coined for it, "variola vaccinæ;" the people at that time were much more fearful of matter from the sore of a cow than from their own children.

It has been remarked above, that the arguments were all obtained from the affirmative or *ex parte* report. The following extract in full, from a contemporary of the *London Lancet*, states the other side of the case.—*London Medical Times and Gazette*, Aug. 31, 1867.

"*Animal Vaccination*.—M. Guerin, in opening the discussion on M. Depaul's report to the Academy of Medicine, on the results obtained from 'animal vaccination,' protested against the exclusive attention which has been paid to this new mode in Paris during the last two years, instead of a faithful comparison having been instituted between it and the old mode. To this latter it has been objected that the virus obtained by 'human vaccination' has degenerated in power, and that it has often been contaminated by syphilitic poison; and before rejecting a procedure so long successful, it is requisite to inquire into the reality of these objections against it. It is indeed a fact now generally admitted that vaccination has lost some of its preservative power, and M. Bousquet himself, who so long denied this statement, now admits it. But two questions call here for examination.—Is such degeneration general and absolute, observable in all countries and regions? and may not a greater virulence of the variolous epidemics have something to do with the relative insufficiency of vaccination? These points want examining, for many practitioners totally deny the diminution of the efficacy of vaccination in their localities, and there is reason, both from experience and analogy, to suppose that the intensity of the variola may vary much in different epidemics. There is a necessity also of making a more careful selection of the virus to operate with, for a defective virus is often employed, and unsatisfactory results follow, especially when such defective virus is propagated from child to child in succession. The selection, propagation, and maintenance of the finest virus—a true 'vaccine culture'—ought to be the object of those having authority in the matter. As to 'vaccinal syphilis,' M. Guerin believes that in very rare instances it may exist; but many of the narratives which have been published of late are wholly destitute of proof, and the liability of such transmission has doubtless been grossly exaggerated. In numerous instances in which the vaccine virus has been taken from subjects exhibiting symptoms of syphilis, no transmission of the disease has occurred.

"There is no case made out for a radical reform in the practice of vaccination, and this 'animal vaccination,' introduced by a young physician from Naples, has been received far too readily as an improvement; for in point of fact it is a mere assertion that it protects from variola as well as the ordinary vaccination.

"While the virus employed in the latter originated in spontaneous Cow-Pock, and that used in animal vaccination is derived from an artificial Cow-Pock; and all must admit that a spontaneous agent is of more powerful action than an artificial one. The vaccine virus, also, transmitted through successive generations, may acquire peculiar and important properties, while the animal vaccination is a much more special and limited affair, the heifer being resorted to afresh in each case. Even comparing the

appearances produced by the two viruses, as stated in the report, it is found that those produced by human vaccination are more regular, and more durable, and more energetic. In fact, as far as we are acquainted with the results of the employment of this virus, M. Guérin regards it as illusory and a mere utopia. He quotes the adverse opinions of many hospital and private practitioners, who have found it decidedly less efficacious, to say nothing of its prophylactic effect, which time alone can decide."

With the foregoing testimony from both sides before you, I have no doubt that you also, have come to the same conclusions as M. Guérin, that "there is no case made out for a radical reform in the practice of vaccination."

Before treating upon the phenomena of the varieties of vaccine as you request, it seems especially important to set at once the minds of medical men at rest, upon the subject of the danger of introducing injurious diseases by vaccination, for in this, after all, consists the "gist" of the whole matter. For, if vaccination from the human race cannot always with an intelligent, conscientious physician (and certainly no other should vaccinate, either from the child or the kine), be performed without the slightest danger of communicating syphilis, then, that from the cow may be preferable, provided the cow can be proved not to be as liable to injurious blood contagions as man. I quote from an essay of Dr. H. Lee, of London, upon this subject:

"This fear of unknown evils is a disease of the mind. It creates more danger than it averts. It weakens the judgment, and betrays the source of reason. It is hard to fear and not to err."

If all medical men had understood from the first the incidental disadvantages occasionally attending the use of vaccine, they would have been in a position to declare to their clients with one voice that vaccination was safe, when such and such precautions were used; and the public would, ere this, have ascertained by experience that under the conditions laid down, they had nothing to fear, either for themselves or their children.

Now although vaccination of all kinds since the days of Jenner has been attended with fewer proportionate failures to accomplish its object, and fewer disagreeable results than any other medical or surgical procedure, yet certainty and innocuousness could always have been obtained by strict adhesion to Dr. Jenner's golden rule "of using only fresh eighth day lymph," an article which should always be easily procured in any well regulated community. I here assert, confidently, that the perfect genuine unbroken vaccine vesicle, between the time of the first appearance of the fluid in it, and the eighth day, or before the inflammatory or pyogenic process, which is marked by the formation of the areola, begins, never contains pus, nor other injurious cells, nor anything but a bland, clear, specific, or *sui generis* fluid, capable, when fresh, of producing only the phenomena which generated it, and never can communicate struma, syphilis, or anything else than the true "Jennerian" variola vaccinæ by direct inoculation.

This statement is fully corroborated by pathologists, by the triumphant experience of the best vaccinators, and by all who make use of that material. Here consider the magnitude of that experience.

The "National Vaccine Establishment" of Great Britain fully confirms it by the practice of more than fifty years. Some idea can be formed of the weight of this authority, when I state that the number of its vaccinations of children in the six years ending 1856, was more than 54,000, who were brought back for eighth day inspection, by the mothers to reclaim a deposit, and that from the eighth day vesicles of these were taken and distributed more than one million charges of lymph to the practitioners of the kingdom without any such accident. Can there be need of further evidence of the perfect safety of the eighth day vesicle?

My own experience also fully confirms belief in the absolute safety of the eighth day vesicle, viz: more than 110,000 primary vaccinations in seventeen years, the vesicles upon over 20,000 of these were opened, and the material used upon the succeeding vaccinees without the introduction of any venereal or other injurious disease. It cannot be said that I do not keep the patients in sight a sufficient length of time to know whether they escape all poisonous infection; because the certificates are not given until I see the cicatrices after the fourth week, and the parents would be sure to call my attention to any complication which might occur. In addition to which proof, my distribution of over 400,000 charges of early lymph to physicians without any injury, it appears to me, is almost culminative evidence.

I will explain in another place the apparent anomaly—that early lymph should not partake of the child's constitutional taints, although that is hardly necessary to prove the absence of danger, because in all my vaccinations I never saw a perfect, unbroken or fit derivative vesicle upon any syphilitic, badly scrofulous, very puny or eruptive children. Nevertheless, I have no doubt that the vaccine disease may sometimes progress perfectly with them; when it has, the evidence is satisfactory that the eighth day lymph from them has been used innocently, and also that the matter exuding through the same spots of soreness has been ignorantly and unjustifiably taken at a later stage, producing in some particular cases syphilis, and in others various results of purulent absorption, etc.

Dr. Lee, in his celebrated article on syphilitic vaccination, says that four very simple rules are sufficient to ensure safe vaccination, viz: 1st. Always use a clean instrument. 2d. Take lymph not later than the eighth day from the vesicle. 3d. Take lymph only, and not allow blood or other secretions to be mixed with it. 4th. To obtain the lymph from a healthy subject. These, I may say in substance, were the directions of Drs. Jenner, Ceely, Bryce, Gregory, Marson and most other good vaccinators, and the same which I have published in former years. I can also say that they have ensured my safety thus far in the vaccination of an ignorant and prejudiced people.

I will here observe, incidentally, as no subsequent reference to these injunctions may be necessary, that the chief objection to vaccinating

directly from the cow, admitting that the lymph had been proved equally protective, arises from the fact that all of the above rules cannot be well observed in selecting it; because the vesicle on the cow runs such an irregular course, and the skin is so dark, coarse and hairy, even in the best locations, there is great difficulty in obtaining only pure, early, thin and unmixed lymph. The pure lymph from Kine, as well as from children, does not readily decompose, and is somewhat antiseptic, while the mixed products, which I have frequently known obtained from the cow, are quite as deleterious as any easily decomposing substances derived from the human race. For these reasons I have never dared, after every precaution in procuring it, to use the bovine material, in my experimental attempts, primarily upon a fine child; but have tried it either upon myself or upon a strumous infant, where no injury to the credit of vaccination could result, in order to ascertain whether it was innocuous, or would produce the genuine Jennerian vesicle and disease throughout.

Your second and third questions referring to the extent of my operations, as well as my success in preventing Small Pox by vaccination, are, I suppose, intended to investigate the justice of the charge that a great part of the vaccination for the last twenty-five years in this city has failed to prevent variola in its subjects. Such a charge impugns my own reputation, and also that of many others. As vaccine physician to large public institutions, and also to quarantine, my numbers vaccinated during the past fifteen years have been considerably over 200,000, and I have not yet heard of a case of variola or varioloid occurring to any whom I pronounced well vaccinated. And I have known of but one death and seven cases of the disease amongst those whom I had not seen after my first attempt to vaccinate; in all of these the eschars were either very imperfect and indistinct, and I had never declared them satisfactorily vaccinated.

The late Dr. Parkinson, who died in 1858, had served as a distinguished vaccinator for about sixteen years to the New York Dispensary; his aggregate was about 40,000; the profession also relied upon his stock of vaccine, and his well remembered testimony as to the result, was, that none had taken Small Pox after his vaccination. Bear in mind that we were both well known throughout the city and country, and that we should have been likely to have heard if such occurrence, either to the work of our own hands, or results of the matter which we distributed, amounting to many times more than that which we used ourselves, had been known. I have had hundreds of opportunities to test the perfect protecting power of human vaccinia during epidemics in families in the city, and in large communities on ship-board, particularly exposed to the infection of Small Pox from one or more members being sick or dying with it: several times indeed, when called early, saving a child which nursed from its mother attacked with the disease.

Dr. Parkinson's experience in this respect was much the same. The testimony of other dispensary vaccinators in this city has been to the like effect; although the number of their patients and terms of service were not so

great as ours. I may mention Drs. McMilland and Warner, of the Northern, Drs. Jones and Cummings, of the Demilt, and Drs. Aigner and Gomez, of the New York. These gentlemen have been the vaccinators in the dispensaries for about sixteen years. It is safe to assert that more than one-half of the vaccination of this city, for twenty years, has been done by the dispensaries, or with virus procured from them. A large majority of the physicians of this city have never had a fatal case of variola after vaccination. Their testimony will also corroborate ours, as to the general good quality of the humanized vaccine, which has been in use in New York.

Observation of the natives of this city will show fewer scarred with Small Pox in the last quarter century than in the previous one. I quote the following, with the remark that it corresponds with the experience of public vaccinators in this city:

Dr. Ward, of London, says: "I have been a vaccinator of the National Vaccine Establishment for more than forty years, and have vaccinated during that time about 48,000, and I feel justified in expressing my entire conviction that vaccination properly performed is as effectual a preventive of Small Pox, as Small Pox itself is. Two points of inquiry have always engaged my attention—the one as to the occurrence of Small Pox after vaccination, and the other as to the number of persons re-vaccinated. None of the total number of these have yet died of Small Pox, and of the total, not 3,000 have been re-vaccinated; proving to my mind most satisfactorily the delusion of the idea that the protective powers of vaccination are diminished or worn out in course of time."

There should be but slight occasion in this place to declare the vast amount of good that the vaccinia from the human arm has done since the opening of the present century; your correspondents admit it, but only charge the recent stock in this city with want of prophylaxis. This must be contrary to the opinion of almost every physician, for nearly all can recall instances where they also have, like myself, immediately protected their exposed friends or patients by vaccination with the humanized lymph.

But we have other grounds for our belief in the protective character of our vaccine. Dr. Jenner devoted a long life to the study of the true, prophylactic disease; he proved that good humanized "vaccine" produced a certain regular series of peculiar phenomena, and that its subject was as well protected against variola by it, as any other person was, by a previous attack of Small Pox, against a second infliction of the same disease. This he demonstrated by exposure of the vaccinee to the contagion of variola in every manner, including inoculation.

It was repeated so often, and the vaccine disease described in precisely the same way by the extensive and early vaccinators, that we feel justified in declaring, at the present day, whenever we behold the same genuine vaccine disease, that its recipient is protected. Hence the only important question now is, have our medical men the necessary knowledge and integrity? I believe that they generally have. Let a commission examine the vesicles and crusts of the vaccinia now in use, and decide.

Your fourth question asks whether other diseases than the "vaccinia" have been caused by my stock of lymph. In answer I can aver, promising that I have not used the "bovine virus" in more than one hundred cases, that I have never had cause to believe that scrofula, syphilis or other injurious diseases have been caused by my vaccine virus; also, that the charge of injury has never been made and believed against it.

Your fifth question as to the evidences of the true vaccine disease will be most succinctly answered by describing my processes of vaccinating, and the rise and progress of the vesicles upon the infant arm. The "vaccinia" has been often and always portrayed in a similar manner by Jenner, Clesly, Bosquet, Bryce, Gregory, Hooper, Marson and many others; therefore, nothing original or different from the text-books can now be expected. I vaccinate, on the average, in four places, but differently, according to the kind of virus used; generally over the insertion of the left deltoid muscle, when the fluid lymph from the seventh or eighth day vesicle is convenient, only by a single puncture or minute opening to the true skin, in six to eight points around and in the area of a circle of about half an inch in diameter; in any shape, however, that the groups may have, the insertions should be from one-sixth to one-quarter of an inch apart. The fluid is conveyed into the punctures either by the lancet or quill point.

As the circular shape of the vesicles is assumed around or over the points of absorption, or grafts, their average diameter on the tenth day will be about one-quarter of an inch; they will, therefore, nearly touch each other, or, if they should be in juxtaposition, afford mutual support in case of an accidental rupture; the crusts from such vesicles which were just in opposition on the tenth day will be somewhat smaller and separated from each other on the twentieth, at which time they can generally be removed without pain, and the sero-purulent spots at their bases will dry in a few minutes, and all soreness, disease or trouble from the vaccination be at an end.

The method of employing dried eighth day lymph, such as is supplied upon one end of the convex surface of a half section of goose quill or a slip of bone or ivory, is necessarily different from that of the preceding, mainly because of the difficulty and waste there would be in pressing it into separate minute punctures; therefore proceed with the point of a narrow bladed lancet to pick out from the arm in the usual place a dozen or more minute particles of cuticle, in close juxtaposition, in a circle of about one-third of an inch in diameter, so as to expose the true skin, and upon the moist surface or excoriation thereby produced, dissolve and commingle the dried lymph by gentle friction. A group of three of these, the number I advise; will produce rather more vesicle, but about the same amount of eschar as nine of those from the single point of absorption. The calculation is, that summed up, the eschars in either mode would be equal to covering a circular area of three-quarter inch diameter. These larger separate groups of

absorption will assume as nearly as possible a circular form, generally with only one systemic central depression, and the crust, from its size, will remain longer attached than the smaller.

My chief study, ease and safety to the child, and "*cæteris paribus*," rapidity for myself, has led me to vaccinate, for years, in the manner described. But other methods may answer as well; he is the best vaccinator, who has proportionately the most vesicles to go on regularly and unbroken with the least constitutional complication, and their perfect incrustations to separate at about the end of the third week.

Describing the progress of the vaccine disease, one will mostly find after these slight incisions, that they have healed almost before the second day, and that no trace of the vaccine can be found; on the third day, however, the site of the insertion may be felt, like a small pin-head, enlarging by the fourth, at which time a convex lens will show a slight redness over and around it, and also the presence of a minute amount of fluid; by the fifth and sixth days a central depressed vesicle is well formed, this structure is generally full of a clear, watery lymph, on the seventh and eighth days.*

On and after the ninth day a slight pyogenic process makes the contents of the tumor change in color, consistency, etc., by its cells, which correspond to the structure of the subjacent cutis-vera, breaking into each other, and also into the circulation of the skin.

The vesicle on the ninth and tenth days presents a depressed centre and a symmetrical, elevated, turgid, hard, glistening margin, the breaking of which is easy, but should be carefully avoided. About the eighth day an

* The analysis, both chemical and microscopical, of the seventh or eighth day pure, clear, thin, watery vaccine virus, at this its most valuable or most concentrated period, shows, as the words imply, only a thin, limpid, liquid lymph; the mysterious prophylactic element can not be seen nor analysed; frequently after the power of the vaccine is lost, no change can be detected in the appearance of the lymph. The evanescent, minute, subtle substance which we apply to the absorbents in vaccinating, seems to act like a leaven; it probably, in the first few days of its power, attracts water both from the air and from the sweat apparatus of the skin; a closure of the communication with the other parts of the cutis, probably takes place at first.

The above explanation accounts for the fact that no disease can be communicated through the medium of the contents of the early vesicle. It may be observed, that pathologists, after a vast number of trials, have found it impossible to inoculate any disease with the sweat, or serum from the capillaries, and also anything else from that of the vaccine vesicle than the vaccinia.

The fact that the system is not generally protected against Small Pox, until the eighth or ninth days, and also that a re-vaccination of the same subject will mostly take perfectly, and regularly, up to that time, on another part of the body; and almost so, even when in close proximity with the first vesicle, only running in that case a more rapid course, demonstrates the correctness of the theory, that the fluid in the early vesicle does not partake in the least of the character of the blood or constitution upon which it is placed; because as nothing is absorbed from it at the early stage, then *vice versa*, it can not have mingled with any of the specific secretions of its base, at that time. All that it seems to need at first in its application, is a smooth, perfect, firm, active, healthy "tone" of the skin, and for that reason Dr. Jenner preferred the cutis upon the arm of a fine infant; this has been found, since his day, the best soil for the finest vaccine culture; the place where it can be refreshed and strengthened, the most innocently and surely.

increasing areola of redness, resembling inflamed skin, begins to surround the vesicle closely, attaining its greatest thickness and size in two or three days. This does not, on the average, extend more than half an inch around the vesicle of one-quarter inch diameter, but proportionately for a wider one. The firm areola, consisting of congested skin and sometimes of the cellular tissue beneath, although not often painful, cannot be roughly handled or pressed without pain or risk of further inflammation—adenitis and perhaps traumatic erysipelas. On or about the eleventh day the hardness begins to soften, and the color to fade gradually day after day (resolution); the vesicle then appears to shrivel and dry slightly and slowly.

A certain gradual process of purification, or absorption, is commonly established with its contents by the aid of the vessels of the skin and the chemical action of the air and light after the twelfth day, seeming by the twenty-first day to leave the lymph almost by itself, hardened, amber-colored, semi-crystalline, diaphanous and covered by the darkened cuticle, which varies in color, according to that of the surrounding skin, the product falling off in the shape of a very thick, roundish, countersunk scab, on about the twenty-first day. Its thickness should be about one-third of its large diameter. It is probably the thickest and heaviest scab or crust produced upon the human body, therein differing from the vaccine crust on the bovine species, which is usually light, thin, porous and crumbly, or sometimes lardaceous.

The microscope will often detect connective tissue, and separations of a very fine, pure crust, into the cellular formation of its original vesicle; or, when it becomes old and dry, if carefully preserved, it will divide into the same shapes which had their bases upon the cutis-vera. The material of this clear, perfect, genuine, Jennerian, typical, characteristic, *sui-generis* crust is generally the satisfactory, ultimate test of the thorough prophylactic disease, and should always be inspected, as it is the best of the usual and necessary proofs. It is a pathological specimen of Jenner's strongest, unanswerable argument, *i. e.*, "That made with the point of the lancet." (The time may come when the *seal* attached by the physician to his certificate of genuine vaccination will be this "*ultima ratio*," or crust, safely inclosed in glass or some other transparent substance.)

The scar, which I shall next describe, is not by any means so good a test of vaccinia, since a similar appearance can be produced by a slight circular superficial burn, or abrasion or other injury which only destroys the top of the skin; its peculiar appearance being merely caused by the structure of the cutis, and not, as has been thought, by the material impressed upon it. Nevertheless, the perfect appearing cicatrix possesses a certain value. It appears to be usually permanent through after life, of the shape of the crust which left it, depressed, foveated or dotted with small pits, which often, from the pressure which was upon the centre, assume a beautifully radiated appearance.

I have thus described the vaccine disease as it appears, with slight unim-

porant modifications, in more than ninety-eight per cent of the cases on healthy children. Performed with fresh eighth day lymph, it is a mild, benign and innocent phenomenon, never attended, according to my experience, with as much danger as a deep pin scratch, or a superficial burn or blister of the same size.

The feverish symptoms attending it are generally very slight; a little heat of skin and general "malaise" about the end of the seventh day, which is often overlooked if not watched for, and a slight return of fever on the tenth day, commonly rather heavier than the first; soon after which, if no violence is done to the vesicle, all danger is over. The troubles and complications attending the evolution of vaccinia in young children are exceptional, and almost always caused by neglect, injury, or some agency or circumstance in the constitution of the patient, or his surroundings, foreign to the vaccine virus. Indeed, having been obliged to vaccinate a vast number of exposed children, who were either strumous, eruptive, marasmic, syphilitic, or affected with various internal and external complaints, I have oftener seen the disease of the subject benefitted by the derivative counter-irritant or other action of the vaccinia than aggravated by it.

And it is most astonishing to reflect that I have never had any death occur, to my knowledge, in any vaccinated person, within six months from the time of vaccination, except three, from scarlatina.

The subjoined *fac simile* of a circular, shows that the British Government, the highest authority on this subject, relies entirely upon the eighth day lymph for vaccination:

National Vaccine Establishment for the Gratuitous Distribution of Vaccine Lymph.

NOTICE.

Vaccination from arm to arm with recent liquid Lymph is, of all methods of vaccinating, by far the most satisfactory in its results. It is therefore desirable that Surgeons, in vaccinating, should as far as possible maintain such a *succession of cases* as will enable them uniformly to operate by that method.

The preserved Lymph of the National Vaccine Establishment is sent out as follows:—1) liquid, in hermetically sealed capillary tubes; 2) dry, on ivory points; 3) dry, between plates of glass. And the lymph, preserved in these ways respectively, is to be used according to the following instructions:

1. In proceeding to use a charged capillary tube, snip off its two ends. Then blow into one end of the tube, so as to drive the Lymph through the opposite end, either on the point of a lancet, or on a small plate of glass from which the lancet may be charged.
2. In proceeding to use a charged ivory point, moisten *very slightly* its charged end. Let the ivory point then stand for a few seconds, till the Lymph on it is brought to its original consistence. The Lymph may then be taken off with the point of a lancet, and this lancet be used as in ordinary arm-to-arm vaccination. Or simple punctures may be made with an uncharged lancet, and

the ivory points, with the moistened Lymph on them, be inserted into these punctures.

3. In proceeding to use a charged plate of glass, moisten the Lymph as under the last instruction, and take off the Lymph without a lancet.

Lymph may be obtained, by *personal application*, from Mr. John Newton Tomkins, Inspector of the Establishment, at the Central Station, 8, Russell Place, Fitzroy Square, London, W., between the hours of 10 a. m. and 2 p. m.

Letters of application for Lymph may be addressed, not stamped, as follows:

To the Medical Officer of the Privy Council,

8, Richmond Terrace,

National Vaccine
Establishment.

London,
S. W.

Knowledge of the different stages of the vaccine disease is best gained by daily observation, and every young physician should make himself familiar with them by closely following up a few cases. There are, however, certain periods in its evolution, at which the experienced practitioner assures himself that the genuine disease is in progress, viz: on about the ninth day, and also about the twentieth, when if the vesicle seems to have been perfect and unbroken, he is assured, provided that a certain amount of surface is covered, say the third of a square inch, by the "sore," that all which vaccine can accomplish has been done; but if the perfect crust is seen or taken off by him, then it is still more satisfactory. Where nothing of the signs is perceived but the eschar, the genuineness of the vaccination is left in some doubt.

Your sixth question asks: "What are the dangers of vaccinating from the human subject?" I answer that with the clear, fresh or well preserved eighth day lymph from such vesicles as I have described, with the rule of using a clean instrument, and taking only from an apparently healthy child, there are none. The experience of the most extensive vaccinators and disseminators of the virus, triumphantly prove the assertion.

By well preserved virus, I mean that which is kept, immediately after it is drawn, free from further moisture, heat of over 40° Fah., and strong daylight, which not only rob it of its specific virtue, but the first two of which have occasionally caused a putrefactive change, that, when inoculated, produced deleterious effects. Heat alone will not render dried lymph poisonous; it only gradually deprives it of its "Jennerian" powers.

In view, therefore, of the complete innocence of early humanized lymph, its perfect protective power, and the facility of guarding against deterioration by the above mentioned methods, as well as the superior ease of obtaining it pure, for all our stock in any community where vaccination is seasonably attended to, we may well ask: "Could anything more be desired for the performance of this most successful operation? Is not the motto '*Tuto, cito et jucunde*' strictly applicable?"

The perfect, clear, well purified crust, of which every good physician should be a judge, from a healthy child (as a rule no other can produce it,

and, it is without exception as far as my experience goes), with the above precautions as regards heat and moisture, will generally produce the perfect effect without any danger: but, as it contains more or less of a material foreign to vaccine, there is no reason to believe that in a series of vaccinations from one to another by crusts, without the use of intercurrent eighth day lymph, the "Jennerian" disease deteriorates. Hence, in some places, old practitioners, with very respectable patients, afraid to use any other stock than that obtained from their own clients, not being able in all seasons to keep up the regular connection of eighth day lymph, and obliged to vaccinate as we might say from crust to arm, have been found to be using virus which would not produce the genuine disease throughout and would not protect against Small Pox.

I will here mention an exceptional danger which has followed the use of the article in question. A perfectly formed and preserved vaccine crust, although it would not be poisoned by means of the blood or general system, might be soaked in the secretions of variola—in one of those rare cases, when both diseases run their course in a subject at the same time, from the vaccinia being too late to arrest the progress of the other, and when used to inoculate, from some occult cause, only produce the Small Pox; but generally, however, the antidote would effectually cut off the progress of the bane.

Such effect from a crust from Philadelphia, was observed by Dr. Elisha Harris, Registrar of the Board of Health, in the course of his labors, as a member of the U. S. Sanitary Commission, another by Dr. Petticolas, formerly vaccine physician of Virginia.

A vaccine crust might be criminally deprived of its virtue by high heat, and afterward impregnated with various virus, or it might at any time be surreptitiously imbued with syphilis; in the latter case the venereal might follow the vaccinal phenomena. Against such crimes as these no virus or crust, whether from man or beast, could be guarded. Extraordinary as it may seem, it was suspected that such practices were pursued toward our armies by undiscovered conspirators at the North during the war.

Dr. Harris has proved that the bad sequels of vaccination of soldiers were due either to violation of Jenner's rules, or to the bad management and cachectic condition of the patient, in an able and important paper to be found in the first volume of the "Medical Memoirs of the U. S. Sanitary commission," page 137. His opportunities for experience upon the subject far surpassed those which any other physician ever enjoyed; they consisted in the personal inspection, in hundreds of places, both North and South, of extensive vaccination of soldiers, and also in the collation of manuscript and oral accounts of their results from a great number of medical authorities in both the Union and Confederate armies; the following is his conclusion: "Genuine vaccination was found an absolute safeguard against Small Pox. The experience of more than two millions of American soldiers in the war of the rebellion has demonstrated anew and upon a

gigantic scale, both the importance and correctness of Jenner's rules for procuring the full benefit of vaccinia, and transmitting it to others in all its original and pure prophylactic power."

It will be well to enumerate the causes of the preventable as well as unavoidable accidents, complications, and disappointments, which may follow vaccination, premising that what are called the inevitable, have no relation to the material used; but are due to the condition of the patients, or external influences, and could often be avoided by deferring the operation till the patient became well, were there no risk of the intervening contraction of Small Pox; and that the preventable are always due to ignorance, or violation of Dr. Jenner's rules, leading to the use of late, decomposing, purulent, or other impure or tainted matter. The inevitable results would as surely follow the use of bovine as of human virus, while the avoidable class of troubles would be more likely to ensue from the "animal vaccine" from causes which I will soon attempt to elucidate.

Much vaccination has always been done in all countries by ignorant or non-medical people, unaware of the proper rules of the disease, but seemingly believing that vaccine was so powerful and pure (almost magical), that "once a vaccine sore, it most always remain such," and that no harm or failure could ever arise from anything which had even the most remote connection with the vaccine on a healthy subject. From such have arisen most of the failures and trouble attributed to vaccination at the present day. Indeed several physicians have told me that they reasoned thus: "I am allowed to use the vaccine crust, which, I believe, contains of course all the material of the vesicle through all of its stages, therefore, if it be safe to use the scab, it is just as well to use matter from the vesicle on the tenth, eleventh, twelfth or any later day, provided the 'child' is fine. And I have never been particular about the day." They have never thought of the purification usually carried on after the twelfth day to form the crust.

Mr. H. Lee (*London Lancet*, page 423—1865), says: Jenner warned the profession in his day against the belief that every successful inoculation with matter taken from a vaccine vesicle, was necessarily the real vaccine disease; and he especially notices that after a vesicle had suppurated, it was very liable, upon re-inoculation, to produce an affection which was not followed by the legitimate results of the disease upon the patient's constitution.

The transmission of a poison, and of an action produced on a poisoned part, may be clearly distinct; and to conceive them to be necessarily the same, would be to give up a distinction which Jenner and John Hunter clearly and particularly recognized. I have known instances of vaccinators, some of whom were physicians, using on the eighth day sero-purulent matter from an already broken vesicle, evidently believing in entire safety because the infant was healthy, and it was the eighth day, not understanding that spurious or injurious virus could often be obtained from a well child, and abnormal processes also be instituted on the site of the vac

tion. I will here observe, incidentally, that an interruption or partial failure from injury or otherwise, of a primary vaccination, should be carefully avoided, because it renders succeeding attempts to fully protect against variola, much more difficult, and sometimes impossible, for months.

The only place to vaccinate is on the outer surface of the skin, a locality from which a poisonous substance is generally thrown off; but if any foreign body be placed beneath it, or in the cellular tissue, there are only three modes in which the system can dispose of it. First, by (most rarely), encysting it. Second, by inflammation and ulceration out through the skin, often leaving a large fistulous opening with hardened edges, for months. And third, absorption into the circulation, sometimes followed by pyæmia or local deposits. Injurious, and often fatal results may follow the careless introduction beneath the cutis, of any foreign substance. Pure eighth day liquid vaccine, when so deposited, would generally be entirely taken up and carried off without any sensible harm; but late or decomposing lymph and crust, being foreign bodies, will often be productive of injury, while if they had been merely deposited upon the most superficial abrasion, which is all that is necessary in vaccination, they would, in as much as ninety-eight per cent of the cases be thrown off without harm, in the other cases they might cause erysipelas or evanescent eruptions. This accounts for the small amount of injury caused by ignorant vaccinators.

Instruments which may puncture the skin deeply, are not safe, except in skilled hands, for the foregoing reasons. There are sometimes atmospheric conditions when the purest clear lymph, even when dried, will decompose or putrify in a short time. Common Croton water will soon putrify in hot weather, and become poisonous to inoculate; but on these occasions late lymph and cow-lymph will decompose so much sooner than pure eighth day human lymph, that they are consequently attended with the most danger. The subject of injury by means of the vaccine virus would be almost completely set at rest, could all the evidence be diffused, which about five years since Dr. Simon, Chief Medical Officer of the General Board of Health in England, collected from the answers given to the following query:

“Question—Have you any reason to believe or suspect, that lymph from a true Jennerian vesicle, has ever been a vehicle of syphilitic, scrofulous, or other constitutional infection, to the vaccinated person; or that unintentional inoculation with some other disease, instead of the proposed vaccination, has occurred in the hands of a duly educated medical practitioner?”

The answers were overwhelmingly and conclusively in the negative. They came from over five hundred distinguished, scientific, practical authorities, medical boards and corporations of hospitals, etc., medical staffs of armies, medical councils of governments in all parts of Europe and all the rest of the world, which were thought to be good authority upon the subject. The last clause of the question, whether unintentional inoculation with some other disease instead of the proposed vaccination has occurred in

the hands of a duly educated medical practitioner, was answered unanimously in the negative, and it was observed, that the true vaccine vesicle can always be easily distinguished from any other form of cutaneous disease by a connoisseur. All concluded that no disease could be regularly reproduced by inoculation, excepting the vaccinia, variola and syphilis, all other results were merely the effect of purulent or putrefactive decomposition or slight blood poisoning, analogous to that of dissecting wounds. The wonderful fact was revealed, that in every investigated case of injury, whether syphilitic or otherwise, no educated practitioner was chargeable, but that all followed from ignorance.

The inference seems to be clear, that neither medical science nor boards of health are called upon for any radical change in the mode of vaccination, as the same ignorance must still exist, and would produce, probably, more injury in vaccinating from the cow than from man.

It appears that Italy, where the new movement originated, is proved to have caused more vaccinal syphilis than all the rest of the world, and this through ignorance of the doctors; and in the efforts to screen and exculpate them, this extensive bovine movement originated. It was naturally transplanted to France and some other countries of continental Europe, where the same mistakes had been made. It has often seemed as if they were unwilling to accept of the whole of the English rules of safe vaccination, enunciated by Jenner; but were constantly seeking to show that some could be neglected, whilst changes could be made in others.

It would be very interesting to copy, did space allow, all the answers to the syphilitic or contagion-inoculation question just noted.

The following, however, may be considered a succinct summary—it is by the authority of those distinguished pathologists, Rokitsansky, Hebra, and Skoda:

“The contagious matters hitherto known which may be conveyed by inoculation, reduce themselves to chancre-matter, containing syphilitic virus, and the contagion contained in Small Pox and vaccine vesicles; it remains therefore only to be considered, whether these morbid animal products can combine, and whether a vaccination with them so combined has already taken place, and what have been the results of the same?

It is well known that comprehensive answers to these queries, by Sigmond and other physiologists, have for a long time existed. They are uniform in the opinion, that in case of vaccinations, with secretions containing several peculiar descriptions of contagion, either it did not take at all, or in a mixture of chancre-matter and vaccine lymph, only chancre took; and in mixing vaccine lymph and the blenorhagic secretion, only cow pox took.

Thus only one disease was communicated, either Small Pox or syphilis; a proof, certainly, that both contagions cannot be conveyed at the same

time. Confirmatory of this are the experiments of Heim, Ricord, Bosquet, Taupin, &c.*

Although by many it is maintained that the blood of the individuals affected with secondary syphilis can serve as a vehicle for this specific contagion, even this would not exercise any influence on the practice of vaccination; for both experiments made on purpose by Heim, and accidental vaccinations, have taught that without considering the quality of the vaccine lymph, that taken from syphilitic subjects may have been used upon healthy persons, and the contrary, viz, from healthy individuals, and used upon persons suffering from syphilis, without, on such occasions, the latter disease having been conveyed with the cow-pox. What has here been proved in reference to syphilis may be applied equally to all other dyscrasic diseases, since these, even in cases of direct vaccination with their morbid product, have always shown a negative result. Although it is proved without doubt that scrofula, tubercle, rickets, cancer and other diseases of the blood are not conveyable, either of themselves or by means of vaccine lymph, still the vaccination of sick persons is, if possible, to be avoided, since experience has shown that, both with children and adults, the progress of vaccination may be the cause of awakening slumbering ailments, or of aggravating them; further, that the vaccination vesicles with such individuals easily degenerate. Nevertheless, these are perfectly fit for the purpose for further vaccination, even in cases of imperfect generation; for if vaccine lymph taken from weak, scrofulous or rickety persons, at its best time, is used upon healthy persons, a complete taking may often be observed.

In the same manner that, in every appearance of the disease, the general characteristic may be observed which distinguishes it from other similar diseases, so also do vaccine vesicles possess peculiarities enough in their form, size, number, the places in which they occur, and particularly in their progress, to distinguish them easily from other vesicular or pustular eruptions on the skin. So great a knowledge is certainly not necessary to diagnose a vaccine vessel that a person has not the right to presume with safety on such knowledge being possessed by every properly instructed medical practitioner.

It is a beneficent provision for science and humanity, that contagious, transmissible products or principles produce, each one for itself, different distinctive principles, and that there is no hybridity amongst them, as the popular prejudice would seem to infer; because when one disease follows another, each must be traced to its proper source, and the danger learned, so that it can be avoided.

Ricord, Vinnais, Acton, Lee, and other great pathologists, as well as syphilologists, have laid down the following rule in investigating this ques-

* Since these experiments some new discoveries have been made, but the remainder of their testimony is still well substantiated.

tion, viz: "The source of the reputed infection must be found and proved to be syphilitic."

Now it is very remarkable that as yet neither Dr. Carnochan nor any other physician, has in any case of supposed vaccinal syphilis, in this city, produced the unquestionable syphilitic child or source. This is the positive evidence which any learned surgeon and acute scientific reasoner upon surgical subjects like Dr. Ricord, requires as regards other surgical diseases.

I will give a brief summary of an interesting article upon this subject from Dr. Bell's prize essay to the New York State Medical Society. He condensed it from a paper of M. Vinnais' in the Archives of Medicine, 1861, on the transmission of syphilis by vaccination. The account of the case referred to, is revised from Mr. Lee's paper, "*opéra cit.*"

A woman with leucorrhœa and uterine disease, and three young children in the hospital "Hotel-Dieu," Paris, were inoculated with lymph at the same time directly from a healthy infant in the wards early in October; it took well, and went on safely throughout, with the three infants; but, with the female it entirely failed. The arm all healed up and looked well when she left the hospital on the first of November, and was lost sight of for several weeks. But, early in December, two pustules covered with thick scabs were seen near or upon the site of the vaccine punctures. On the eleventh of January she was re-admitted to the hospital, with an eruption which she said came on about the middle of December. M. Ricord examined the patient and declared, "that she was the subject of two indurated chancres; that she has multiple enlargement of the glands in the axilla; and that she has specific roseola, typical of constitutional syphilis. This constitutional affection he moreover declares "to have had its origin, and its entrance into the patient's system, through the ulcerations on the left arm."

We have two main points to notice in this case, first, the vaccine lymph used, was not syphilitic; the idea of such a catalytic change in an instant, is extravagantly absurd; second, the woman was lost sight of for several weeks, long enough to have rubbed any amount of syphilitic virus into the arm, an event not improbable in Paris.

This case, however, has been cited as one of the strongest proofs of vaccine syphilitic infection. It is probable that but few were acquainted with the whole of the facts in the case, otherwise such inferences would have followed. Ricord's opposition, however, to admitting "vaccinal syphilis" mostly because of his sometime unwillingness to admit the contagiousness of secondary syphilitic fluids or products, as well as his long adherence to his former doctrine of the auto-inoculability of adhesive primary matter, has led him to conclusions very injurious to vaccination.

The following remarks from the same clinical lecture, based upon this case, show the falsity of some of his reasoning, and make us think that the great John Hunter was even in his early day a much better syphilopathologist, as he said that true chancre, indurated, was not inoculable upon the

same subject; a truth fully brought to light of late years. "M. Vinnais and M. Rollet agree that syphilis is not transmitted by vaccine lymph, but by the admixture of the latter with the blood. In a recent vaccination, which caused considerable sensation beyond the Alps, it has likewise been contended, in order to account for the propagation of syphilis, that blood oozed out, together with lymph, from the pustules of the child who supplied the matter, and the lancet of the operator was therefore charged with a mixed fluid of deleterious nature." M. Ricord, while admitting the truth of these facts, rejects the interpretation which has been offered.

"It is a remarkable circumstance," said he, "that as soon as the generating poison of syphilis has penetrated into the system, it is fundamentally modified. It becomes undiscoverable to chemical analysis or to microscopic research, and utterly loses its distinguishing character of reproducing a pustule similar to that in which it was originally generated. Were it otherwise, in a person tainted with syphilis, the most trifling wound would be liable to assume the aspect of chancre from contact with the blood escaping from the lacerated vessels. Nothing of the kind is ever observed. I have performed operations on many individuals suffering from constitutional syphilis, and I never noticed, even in a single instance, anything particular in the aspect, progress or duration of the wounds." This is specious reasoning or sophistry; the same as asking us to believe that because a syphilitic poison is not auto-inoculable, it can never, therefore, be inoculated upon another person.

M. Ricord declared that he gave his full approbation to the conclusions of a paper published in the "*Gazette Hebdomadaire*," by M. Jacond, on the distressing occurrences observed during the course of last year, in the province of Acqui. M. Ricord, after reminding his readers that at the end of the month of May, 1861, syphilis broke out three weeks after vaccination, in forty-six infants, at Rivalta, proceeds to state "that an inquest was held as to the cause of the calamity, and that despite the apparent clearness of the facts, the committee appointed to investigate the matter, declined to pronounce on the alleged connection between syphilis and vaccination, and declared that in order to form their judgment, further inquiry was necessary." He continues thus: "The gentlemen were both prudent and wise. Before admitting that syphilis in this instance was transmitted with the vaccine matter, many difficulties and obscurities have to be cleared away; it would further be necessary to solve several important questions which at present it appears impossible to reply to. For our own part, an attentive perusal of the documents of the case has led us to the same conclusion as Dr. Abertetti, who exonerates from all blame the vaccination in question. The events in Rivalta present to our view two conspicuous, but wholly distinct facts, viz: the vaccination of the infants and the subsequent appearance of syphilis in certain of their number."

It is granted that these two orders of facts occurred in succession, but the present we are not prepared to go any further and to argue, pos;

hoc, ergo propter hoc; the coincidence is obvious, not so the inference of causality. Whatever interpretation be adopted as to these facts, they convey a useful caution, and illustrate in an eloquent manner the necessity of taking into account the manifold elements in the etiological history of vaccinia and the extreme reserve required by the physician in cases of this description. "This view," said M. Ricord, "is in such perfect harmony with mine that I have nothing to add to M. Jacoud's remarks. Let us admit and carefully inquire into these cases, and let us guard against any predetermined notions on the subject; but as to the interpretation offered, let it be received with an amount of hesitation and doubt, increased by the obvious fact, that if ever the transmission of syphilis with vaccine lymph is clearly demonstrated, vaccination must be altogether discontinued, for, in the present state of science we are in possession of no criterion which may permit the conscientious practitioner to assert that the lymph he inoculates is perfectly free from admixture with blood tainted by syphilis."

Could there be a grosser or more mischievous "*non sequitur*?" It can only be accounted for by the reason previously given.

M. Ricord cannot think that any pathologist believes that the variolous pustule can change to the vaccinal or syphilitic, and it would be quite as absurd to think that the vaccine vesicle can be metamorphosed into the variolous or syphilitic, or that the water in the vaccine virus is identical in its composition with the blood. It is reported that this great master in medicine has since changed his views on the above important points. It is to be hoped for the credit of his reputation in his life-long specialty, that he is at length fully convinced.

All these Rivalta cases, and also that where another Italian physician at Lupara used lymph from a tube plainly admixed with blood, were the clearest violations of Dr. Jenner's rule, which alone constitutes perfect safety. M. Jacoud's paper was only an attempt at what we designate "whitewashing" ignorance of true vaccine lymph, and the institution of animal vaccination was a legitimate effect. In concluding the subject of the evils which may follow bad vaccination, I cannot do better than quote from the report of the American Medical Association: "Among the earliest objections urged against vaccination, even during the time of Jenner, was the alleged danger of communicating other diseases with the vaccinia. And from that day to this, cases of cutaneous disease, syphilis, scrofula, etc., have been occasionally attributed to this cause. But if it were now possible to collect all such cases, even then their utter insignificance, when compared with the multitude that have unknowingly been vaccinated with lymph taken from diseased persons without contamination, is such that this evidence alone against the transmissibility of other diseases by vaccination, would be sufficient to establish the conclusion as a general rule that there is no danger of communicating other diseases with 'vaccinia.'" This conclusion is in keeping with the recorded experience of Heim, Ricord, Bosquet, Tanpin, Landomry, Friedinger, Marson

many others who have investigated the subject, and may indeed be regarded as an accepted truth by the most distinguished men of the medical profession.

The recorded facts, the arguments and deductions made by investigators in reference to the possibility of transmitting other diseases with vaccinia, added to the facts positive and negative which have presented under our own observation, not only confirm our belief in the non-transmissibility of other diseases with the vaccinia as a general law, but demonstrate that vaccination, in preventing Small Pox, often indirectly fortifies the constitution of the individual against some of the most of those very diseases which are erroneously alleged to be transmitted by it.

We would not, however, be understood as approving of the use of vaccine virus obtained from diseased persons; but on the contrary, none should ever be used knowingly, except that which has been obtained from perfectly healthy subjects."

We have always followed this rule, to obviate the slightest risk or discredit to vaccine.

The following is the resolution of the American Medical Association, which called out this report, and the names of the committee appointed to it in 1865:

"*Resolved*, That a central Committee of five be appointed to enlighten the public mind by all available means, upon the value and necessity of universal vaccination."

A. N. BELL, *Brooklyn, N. Y., Ch'n.*

J. P. LOINES, *New York.*

H. D. BULKLEY, *New York.*

A. NEBINGER, *Philadelphia.*

JAS. F. HIBBARD, *Richmond, Ind.*

The next question in order refers to the relative value of bovine vaccine. There are two varieties of this. First, that produced by variolating the cow; a very difficult operation, but which was actually done by Mr. Ceely, and another English physician, and also by Russian and German physicians.

Drs. Jenner and Waterhouse both knew of instances of the transfer of Small Pox from man to the cow. This virus is in its first few removes, only a modified Small Pox, but with skillful transmission through from three to five infants, it is changed into mild but genuine vaccine.

It is rarely advisable to use this, since it is tampering in the first place with variolous matter, which should always be destroyed as soon as possible; and keeping up the Small Pox infection in our midst like the old practice of inoculation, which some one compared to "breeding tigers in a country, in order to hunt wolves."

The other kind of animal vaccine appears to have two sources, viz: First, that from retro-vaccination, *i. e.*, "from man to the cow," and second, the sporadic, so called, which cattle, it is supposed, communicate to each other; the origin of this is obscure,

According to my experience with both varieties of the above, although failures were more common than with the human lymph, yet where it has "taken" well, it has almost always been a little slower, and the vesicle not quite as full as in that from the child; still, the evidences of vaccinia were generally good; so that by the second or third remove, its phenomena became quite "Jennerian." The retardation, etc., has been noticed by many besides myself, amongst whom may be cited the authors of several text books, Wood, Aitken and others, including those of the French report, before referred to by your correspondents, who say "that the bovine is less regular, durable and energetic than the human vaccine." The retro-vaccine, which I have used on thirty-five occasions, and also that from the spontaneous or sporadic disease, which I have tried fourteen times, when it has taken well, corresponded with the above description; no extra eruption was produced, no difference was observed between the diffuseness of the areolæ, and no complications of adenitis followed either kind. I have had partial failures, and I have then noticed similiar phenomena to those which have followed when human lymph has been taken from a broken or late pustule, or from a re-vaccination which has not run the primary course, somewhat like the results of inoculation of partially decomposing fibrin; but the effects have mostly been local, the pustule has sometimes quickly, perhaps by the next day, followed the incision, the areola has sometimes been irregular and diffused with granular complication, as if from irritation, and a few vesicles have occasionally appeared over it. I have come to the conclusion, that the above mentioned results from the cow virus have mostly arise from the difficulty of obtaining the purest, clear, early lymph, and also that the crust does not often arrive at the same stage of purification that it does on the child's arm. These effects often follow from the circumstance, as I have mentioned previously, that the disease is not regular on the bovine species, and from the fact of their coarse, dark, rough, hairy skin rendering the taking of the lymph at the exact time when it is the most perfect and pure, quite difficult. This also accounts for the more frequent failures with cow lymph than human. The French report admits, and others confess a failure of over fifty per cent in primary vaccination from the cow. This every one knows who vaccinates from the child, is a much greater proportion than his own. I have had over ninety-eight per cent of successes from "arm to arm." We also know that a partial failure in the first vaccination is a misfortune, as it is thereby rendered more difficult to perfectly vaccinate afterward.

Cows are usually vaccinated on the teats and on parts of the udder freeest from hair; but as those only yield a limited quantity, without danger of injuring the milking value of the animal, the smooth places under the tail, and around the anus and vulvæ are chosen. When the vesicle itches, the cow can interfere with it by the use of the tongue, and the secretions of urine and fæces often contaminate it. The inherent difficulty of obtaining pure and unmixed lymph from the cow, may explain the cause of the red tint in much of the Paris bovine vaccine which has been sent for sale to

New York. I have seen it in several instances, and many physicians have also mentioned it to me. Of course no prudent medical person would care to use such a probable admixture of blood or other decomposable substance, whether from the cow or the child, even if it came from the Academy of Medicine. Dr. Jenner used to apologise for sending his correspondents cow lymph, saying that he could not always as readily obtain it from the human subject (which he preferred), as from the animal, because he lived in a comparatively sparsely settled country.

The effects described above, which some, ignorant of its impurity, have called a "sharper taking," and in addition, deeper ulceration, auxiliary abscesses, erythema and pseudo-erysipelas, etc., which have often been noticed by old as well as recent vaccinators, as following cow virus, I conceive, might have been explained as above. The extra eruptions which followed the use of that from the variolated cow in its first reaction, was evidently only a modified Small Pox. Incidentally it may be here observed, that it has frequently been said of late, although not by good authority, that the transplantation to the cow freshened or renewed the powers of the vaccinia; but I should judge the converse, by the general fact of its becoming slower, and its vesicles small and thinner. The proved theory or fact by Jenner and others, that variola and vaccinia are modifications of the same disease, shows that the tendency in the transplanting either, from one species to another, is to modify and lessen, and not to heighten. The best authorities at the present day unite in saying that the true mode of vaccine culture, or of freshening, or strengthening the virus, is to carry eighth day lymph through the finest children.

The bovine virus has been disseminated to a very great extent in this country during the last ten years. I believe that it can be proved that more than sufficient to vaccinate one million people has been supplied. Those who have used it mostly came to the same conclusion as the Parisians, that it is no improvement upon that from the human subject. In emergencies, such as great epidemics in cities, countries or large armies, the fact that the carefully vaccinated cow will produce a fair article of vaccine is of great value, because a much greater quantity can be collected thereby in a short time, than from the human subject. A whole dairy can be farmed out, hundreds of vaccinations can be made simultaneously upon the same animal, while no physician would farm out a child's body; no more unnecessary pain or soreness being justifiable, than just sufficient to protect it from Small Pox. The better way in emergencies, however, would be to send one or more experienced vaccinators to the threatened locality, who should proceed to make as many fine vesicles upon children as possible, and then upon the seventh or eighth day, vaccinate hundreds from every child's arm; this, as I have demonstrated at Quarantine, can be done not only to effectually arrest the Small Pox, but to save the re-vaccinated from the frequent unpleasant results of preserved human lymph, or that from the cow, which is generally of doubtful purity.

Your eighth question as to the danger of bovine virus has been already

partially answered. The previously mentioned unavoidable or common troubles in using cow-lymph, can always be avoided by employing that from the pure eighth day vesicle on the child's arm. The bovine vaccine would be equally liable to all of the other hazards in vaccinating, viz: those arising from decomposition after it leaves the vesicle, and from the idiosyncrasies and accidents of the subject upon which it is engrafted. But if many diseases, as your correspondents say, are to be communicated by vaccinia, let me ask whether the blood or system of cattle is always healthy, do they not have other contagious blood diseases, more serious than syphilis or any human affection? Witness the mysterious cattle plague and throat distempers. Cows have long been known to suffer with scrofulous disorders. Even now, diseased meat and "stump tails" are common.

Although the English have abolished human quarantines, yet as the cattle plague was often brought by apparently healthy animals, the most rigid enactments against importation was found necessary. The secretions of this plague have been accidentally inoculated to the human race with bad effect, so also have those of glanders, throat diseases of cattle, etc. Some of these are worse in every way than syphilis; more contagious, destructive to all the tissues, and fatal. The difficulty of obtaining the vaccine virus at the exact and pure stage, would render disease much more likely to be conveyed to the human race from cattle than from children. Besides the proof is not convincing as yet that cattle cannot be affected by syphilis. French physicians experimented and contended for many years that secondary syphilitic secretions could not be inoculated upon the human species, also that tubercle could not be engrafted upon animals.

Some believe that syphilis originated from connection between beasts in human form and cattle. It has been proved that four kinds of animals can have syphilis; and it may not be very long, in cities of Europe, where sodomy has almost become an institution, before syphilis can be communicated by quadrupedal beasts to each other in the natural way, a mode not pursued in the experiments to inoculate syphilis upon cows in Italy.

It is noticeable that your correspondents have, in their haste to endorse everything which is said to have come from Paris, before hearing both sides, made a mistake in their reference to the non-inoculability of syphilis to cows. They say "one remarkable fact appears further in the body of this report, worthy the notice of every physician. It is presented in the following words: 'From the trials carefully made, it becomes evident that syphilis is not transmissible to the bovine species.'" Now the *Lancet* does not remark that this appears in the body of the report. The editor seems to have interpolated it himself. And there is no authority for saying that the Committee on Animal Vaccine of the French Academy made any trial of inoculating animals with syphilis. It appears on the eighth following page of the same copy of the *Lancet*, that it was the work of an Italian Commission at Florence, and it is very doubtful whether the French report mentioned the subject at all, or at any rate made use of that argument in favor of the bovine virus.

I quote the following to show for what purpose the commission was instituted. "A committee was some time ago appointed in Florence to ascertain this point. Drs. Ricordi and Dell'Acqua were entrusted with the experiments, and after several months' labor, the answer was given in the negative. The original cause of the investigation was a child affected with hereditary syphilis, which had been intrusted to a wet nurse, in a village called Cantu. This nurse gave bran baths to the infant, (covered with an eruption) in a pail from which her cow was (only once) allowed to drink. This cow presented about ten months afterward ulcerations about the mouth, and was taken very ill. It also happened that the bull suffered from ulcerations, which the veterinary surgeon could not refer to ordinary complaints, and the outcry was, that the child had poisoned these animals. More than these two heads of cattle, however, were attacked with ulcerations, and the committee had much trouble in clearing up and arranging these facts."

Not less than twenty-one distinct experiments were made, and the final conclusion was, as we stated above, that the disease in question is not transmissible to animals. Whether or not this curious investigation settles the question of animal syphilis, is yet doubtful; it seems to open to view, however, one of the mysterious and dangerous contagious diseases of the bovine species.

Most animal poisons to the blood or absorbents on the surface of the body, can be taken into the stomach and thrown off by the digestive canal with impunity; for instance that of the rattlesnake, the cobra, hydrophobia, vaccine, variola, syphilis and various skin diseases, blood poisons, decomposing tissue, etc. Further, the blood or secretions of an animal will often be poisonous to inoculate, of which the flesh might be innocuously eaten. Hence, although an animal may appear sufficiently well to be slaughtered for food, yet its blood may be dangerous to inoculate; on the other hand, the school of syphilitic theorizers say that you never can tell, however healthy a child may seem, that it has not syphilis in it, and that all of the secretions of the skin upon any person, partake of whatever taint there may be in that individual; it is therefore not safe to vaccinate from any child in the world. Now if we apply the same unscientific logic to the bovine species, we shall also be prevented from using their vaccine, because animals may appear healthy and yet have insidious diseases in their systems. I have thus stated the proposition, that the dangers which would ensue from inoculation of vaccine from the cow would be greater than from man; because they would be more difficult to avoid on account of—1st, the irregular course of vaccinia on the cow; 2d, the difficulty of obtaining the pure, watery lymph alone, by reason of its irregularity and its rough, dark, hairy base; 3d, our comparative ignorance of the phenomena of the external and the internal diseases of the bovine species.

Your next question, whether vaccine virus weakens by transmission through many human systems, is one of great interest, and will also be found of equal importance in the question of perpetuating it from cow to cow, the only mode of securing the necessary supply, whether the original

sources be a variolated cow, or one in which, as it is said, the disease has appeared spontaneously; since these will always be too rare for reliability on all occasions.

It would be absurd to suppose that there is any more peculiarity in the bovine system to prevent the vaccine from gradually losing its power in going from cow to cow than in that of the human. The above theory is, however, proposed by the arguments of the authors of the letter. It does not correspond with that of the best vaccinators or pathologists, from the days of Jenner to 1868, for they believed that the virtue is inherent or peculiar to the virus itself, and cannot be enhanced by implanting it upon any particular animal. Hence the only reliable, as well as the only available, tests as to its power are, firstly, occasional thorough exposure of its subjects soon after vaccination to Small Pox; secondly, observation whether it corresponds to the Jennerian characteristics, and thirdly, its non auto-inoculability. The last two I submit as a legitimate work for the Sanitary Commissions or Boards in any city or country.

I have previously stated my belief that the stock generally used for twenty-five years in this city by physicians and dispensaries was genuine, and not weakened by transmission. This answer to the ninth query is all that can be given in the present state of statistics.

Much the same answer can be given to the same query, as to whether re-vaccination is necessary, and if so, in precisely how long a time, with how many and how large scars, and in what severity of epidemic, or with what amount of exposure? To answer the question briefly, it may often be necessary to seem to dogmatize. Most experienced vaccinators, both in this city and elsewhere, believe in the rule—that one good vaccination protects for life against the Small Pox, as well as one forgoone attack of variola will save its subject from a subsequent one. Now it is well understood that the rule that one vaccination will protect for life is subject to many exceptions which cannot be foreseen; therefore, as no one can tell whether he or she is not numbered with the exceptions, the safest way consists in trying the absorbents with pure, fresh, eighth day vaccine lymph every few years; an operation entirely innocent, and nowise painful or inconvenient when it is not needed; most opportune and fortunate when it does take effect, and attended with little more trouble and complication than its primary manifestation, and never with a tithe of that which would ensue from Small Pox. The question as to whether vaccination will renew the protection in these exceptional cases, which have completely or partially lost their power of rejecting the Small Pox contagion, has been also settled by statistical investigation, as well as by individual experience. The theory seems to be confirmed by practice that the protection of vaccine in many cases leaves the system gradually, and that the vaccine disease runs a course more or less perfect in proportion to the amount of influence the former vaccination retains. Thus fresh lymph takes in vaccination in different degrees—from the minutest vesicle, which comes up in a short time after the specific insertion, and lasts but a few hours, to that which

runs the slow and regular primary course. It is very important that re-vaccination, to constitute a reliable test, should be carefully and delicately performed, and also be observed on the second and several subsequent days. The cutting should be so minute, and the vaccine so pure and fresh, that if the skin entirely refuses to absorb it, the part may be quite well by the end of the first day. This absolute rejection or failure in my experience does not occur in more than one case in a hundred. About eighty per cent of those with several perfect appearing eschars take as follows: In from eight to forty-eight hours all irritation from the wound or foreign material having subsided, a minute pimple can be seen or felt at the site of the incision, which is nothing more or less than the effect of the vaccine. In more than half of these cases, when uncomplicated by violence, the vesicle aborts and disappears by the third or fourth day, without any areola or soreness. Now those of the shortest duration convince me that the patient was almost, if not quite, as much protected as he would have been by a primary vaccination at the time, and that no further trials are necessary. Most vaccinators, in compiling statistics, having omitted to observe the "arms" on the second or third days, and having only seen them by the fourth or later, when most have aborted, have recorded these as failures. If by that word, the non-liability to variola is implied, I will admit it. Including them, however, I consider that re-vaccination is more successful than primary. The most absolute failures will occur in systems that have never before been touched by vaccine. I have allowed about nineteen per cent for those which show evidences of the vaccine sore after the first week. These are mostly called perfect takings in statistical tables. In my experience, the number of perfect and regular retakings of the disease, within fifteen years from the primary, does not amount to one per cent. One-half of those who show great proclivity to an attack of Small Pox, by the fact of the considerable taking of the vaccine insertions, are subject to trouble from an eruptive, irregular or painful areola, breaking of the vesicles, adenitis, traumatic erysipelas, etc. These are, however, mostly caused by the scratching and violence done to the sore. It is well to observe here, incidentally, that a re-vaccination generally itches more than a primary. But notwithstanding the greater liability of the re-vaccinations to do worse than the primaries, no one would be justified in rejecting the re-application of the boon. The proportions and theory of protection I have just mentioned have been well confirmed by my quarantine experience during the past twelve years. The number retained on board the ship until their protection was proved or renewed by vaccination has been over 80,000 on 160 vessels, or an average of 500 on every one. The exposure on most of these from the sick and dying of Small Pox, in the steerage, was of the most thorough kind; but yet we have never failed to arrest the disease completely within one week after the arrival of the ship at this port. The Health Officers, Drs. A. N. Gunn and John Swinburne, and their deputies, Drs. Walser, Waller, Burdett, Bissell and Reid, will all testify to the correctness of the above. Dr.

Elisha Harris was cognizant of my vaccination on the passengers of two ships, while he was physician-in-chief of the Quarantine Hospitals. The proof is conclusive that, with thorough vaccination, the entrance of this contagion to a city by the seaport can be prevented. I will also mention the fact incidentally that the last epidemics of Small Pox in this city have prevailed at seasons, when for months not a single case of the disease arrived at Quarantine.

Mr. Simon's statistics, before referred to, mostly collected from governmental reports of army cases of Small Pox and re-vaccination, prove conclusively that by it they were saved from the frequent epidemics which formerly prevailed amongst them. And, as stated in the report of the Committee of the American Medical Association in 1865, "This was not the only benefit, knowing as we do, that Small Pox and cow pox are in reality the same disease, the latter being merely deprived of its virulence by having previously passed through the system of the cow, the results of these numerous re-vaccinations are of immense importance not only in confirming the identity of Small Pox and cow pox, but in establishing the no less important fact, that the protective power of Small Pox itself, wears out of the system in a certain proportion of cases, as life advances, in nearly the same ratio as that of the cow pox. Thus in all these armies, a certain proportion of the men were found to have been previously vaccinated, while no inconsiderable proportion had passed through unmodified Small Pox." The same report also after referring to Mr. Simon's tables, remarks: "It is evident from the foregoing statistics, that no certain period of limitation can be fixed for the protective power of vaccination. It is certain, however, that its loss of power bears some proportion to the lapse of time, though it seems highly probable that this apparent loss of protective power is in the same ratio as the varying liability to Small Pox independent of vaccination. Dr. J. F. Marson, the experienced superintendent of the Small Pox and Vaccination Hospital in London, states, that 'but few patients under ten years of age have been received with Small Pox after vaccination. After ten years, the number begins to increase considerably, and the largest number admitted are for the decennial period from the age of fifteen to twenty-five, and although progressively diminishing, they continue rather large up to thirty, and from thirty to thirty-five they are nearly the same as from ten to fifteen; but as in the unprotected, at this period of life, the mortality is doubled, showing the cause to be probably as much more depending on age and its concomitants as on other circumstances. In still further advanced life, the ratio of mortality will be seen to increase also, as in the unprotected state.' According to the statistics of Professors Heim, of Stuttgart, and Retzius, of Stockholm, and Dr. Marson, of London, the liability of Small Pox is found to be as regards age, very nearly the same as the increased susceptibility to a second vaccination, or as will presently be seen, to a second attack of Small Pox. The occasional recurrence of unmodified Small Pox a second time, or after a previous vaccination, does not invalidate the general law, that a person

who has once been properly vaccinated or has once had Small Pox, in general remains protected against a subsequent attack. It is, however, a well established fact that certain individuals who have had unmodified Small Pox in infancy or youth, may, especially if frequently exposed to the epidemic influence of the disease, have it again in after life; and such attacks are always much more dangerous to life than Small Pox after vaccination. All medical men of much experience have met with such cases. Dr. Thompson, of Edinburgh, in his own practice, met with 85 cases of second attack of unmodified Small Pox; and Prof. Heim, 57. It is in vain, therefore, to expect that vaccination will give greater security to the person from a subsequent attack of Small Pox than unmodified Small Pox itself. All that can be reasonably asked is, that vaccination shall give as good security against a subsequent attack of Small Pox as if the person had passed through Small Pox itself; and this, if properly performed, and with good lymph, the accumulated evidence of the last sixty years most thoroughly proves." I append a model of the statistical tables collected by Mr. Simon, premising that the ratios in Prussian, Bavarian, Danish, Swedish and British armies, all of which are at hand, show about the same results.

Vaccination of the Wirtemberg army	14,384
Ratio of success per 1,000 cases vaccinated:	
Perfect success	340
Modified success.....	200
No success.....	400

Professor Heim, of Wirtemberg,* states that during the five years, 1833-7, though Small Pox infection had been sixteen times imported into different regiments of the army, there had ensued among the 14,384 re-vaccinated soldiers, only in person of one whose vaccination two years before had been followed by modified success, a single instance of varioloid. In Prussia, just as in Wirtemberg, the practice of re-vaccination grew out of the knowledge that Small Pox would ultimately attack a certain portion of those who had been vaccinated only in infancy. This knowledge, too, had been dearly purchased in the Prussian army; for during the ten years preceding 1831, cases of post-vaccinal Small Pox were increasing in number and fatality; hundreds of the soldiers were attacked every year, and within the three years of 1831-3, there had occurred no fewer than 312 deaths by Small Pox. For the last twenty years the Prussian army has presented an almost entirely re-vaccinated population, and what has been the contrast? 104 annual deaths by Small Pox was the last experience of the former system; two annual deaths by Small Pox has been the average for the re-vaccinated army. Analyzing, moreover, the 40 fatal cases of Small Pox which in the last twenty years have occurred in the Prussian army, we find that only four of the number were of persons who (it is said) were success-

* See report of Am. Med. Assoc. before referred to.

fully revaccinated. From 1843 re-vaccination had been compulsory in the Bavarian army; and from that date to the present time (1857) neither a single death by Small Pox, nor even a single case of unmodified Small Pox has occurred in that population. For the last twenty-one years re-vaccination has been general in the Danish army, and for the last thirteen years in the Danish navy; and these two populations have almost entirely escaped contagion during several epidemics of Small Pox.

In Sweden the practice is similar, and the results equally satisfactory. In the Swedish army 1,944 re-vaccinations were performed in 1852, of which 644, or 33.11 per cent were successful." The statistics referred to give a proportion of success of about one-third, of modified success one-third, and of failure one-third. These correspond very nearly from the different countries. They are sufficient to prove the necessity of re-vaccination. Properly analyzed and compared, they do not conflict with my results at Quarantine. My time of observation did not extend over six days; but I can vouch that fully two-thirds would show undoubted vaccine sores at the end of a week; what I claim in addition, is this—that by careful observation on the second day, I also found in 98 per cent of the remainder, undoubted vaccine signs; but which, as the system, not needing them, soon throw off, might be called cases of no success; they constitute, however, perfectly satisfactory tests. The word "perfect success" in the preceding table must not be understood to mean an entirely regular, lengthy, uncomplicated course like an infant's vaccination; as I stated previously those do not occur more than once in a hundred times, even during an epidemic. As a correlative, the assertion holds true, that out of one hundred cases of varioloid after vaccination, not more than one would be a severe Small Pox. Another reference is called for upon the question, as to whether several vesicles constitute a better and longer protection than a single one. This is divisible into two parts, first, how large should the vesicle be, or transferring the consideration to the subject of the eschars, how large a surface should they cover? will a group, say of six confluent ones protect as well as six separate and clearly defined, or second, will one-half on one side of the body, and the remainder on the other side, answer the same purpose? Unfortunately the researches of Mr. Marson and others, an analysis of which I propose giving, do not touch upon these latter questions. But, as the English text books generally direct to make only one point of insertion for each vesicle, I conclude that scars of about one-quarter inch in diameter are meant.

My experience, as well as that of many other vaccinators, has shown that one small perfect vesicle will certainly protect for a time, often for years, against Small Pox, with the most complete exposure; but Mr. Marson's statistics prove almost conclusively, by observations of large numbers, that the protection does not last as long from one as from four or more cicatrices.

It is well known that the German practice has been to make so many large sores, that considerable irritative fever or hectic (?) would ensue. I

cannot find, however, by analysis of statistics, and by my Quarantine experience, that their patients are better protected than those with four or five characteristic vesicles. The German plan causes unnecessary suffering and often too deep suppuration for a good vaccination. I believe that a group of confluent vesicles which run as regular a course as the separate, do not suppurate, give an unbroken crust at the proper time, and leave the characteristic eschar, will protect as well as the several vesicles which do not touch each other. The superficies may be calculated as I mentioned when describing the progress of the vaccine disease. The question arises whether Mr. Marson gave any more credit to the group which would only count as one scar than to the small one proceeding only from one point of absorption. Most New York physicians have vaccinated on the plan of the group, and I think that their patients have been well protected. A slight advantage arises from the separate vesicles in their diminished danger of rupture. I think that with more than eight small or two large vesicles, there is increased danger of unnecessary soreness, and irritative fever, which rather weakens the protection. It is also thought that nothing is gained by distributing the vaccine sores on both arms.

The following is compiled from Mr. Mason's tables of Small Pox after vaccination. The London Small Pox Hospital, of which Mr. M. was physician-in-chief, furnished the patients:

Patients admitted with Small Pox.	Number of patients.	Eruption unmodified.	Died.	Eruption modified.	Died.	Total of deaths.	Rate per cent of mortality from small pox after deducting entirely the cases affected by unmodified disease.
1. Having one vaccine cicatrix....	1,357	460	105	897	20	126	7.57
2. Having two vaccine cicatrices....	898	213	44	675	9	53	4.13
3. Having three vaccine cicatrices..	274	50	8	224	2	10	1.85
4. Having four or more vaccine cicatrices.....	263	26	2	243	1	2	0.74
5. Stated to have been vaccinated, but having no cicatrix.....	290	187	69	316	5	74	21.73
Total	3,077	936	231	2,264	37	265	8.77

Since this table was made out, there has been an epidemic in London; 355 more patients have been treated at the hospital, who had four or more cicatrices, only one of whom has died; this number added, makes the proportion rather less than one-half of one per cent. It may be well to observe that nearly one-half of the cases admitted to the hospital had never been vaccinated. The above interesting table shows that the more vaccine scars the patients had, the more likely he was to have the modified disease, and the less likely to die. It appears certain that death from Small Pox will

sometimes follow after even very good human vaccination, though never within five years.

Before concluding the subject of re-vaccination, I should have remarked that it is true that the United States re-vaccinated vast numbers with both kinds of vaccine during the war; but the urgency of the crisis prevented the collection of many statistics—what few were preserved, however of vaccination of recruits in camps, confirm the European statistics; one-third were reported to have taken, although, as the European authorities say, it does not by any means follow that that proportion would have taken the variolous disease when exposed to it, but only that they would have been in some danger. No returns were preserved as regards the comparative success of the two viruses.

European authorities have often resorted to the bovine virus; but with no improvement in the duration of the protection, and the idea of its surely always protecting the patients for life must have originated with some of the physicians of New York.

In approaching the conclusion of this necessarily desultory paper, it must be remembered that it has consisted mainly of two objects, one of which was, to throw light upon the whole subject of human vaccination, in order to protect against Small Pox in the most efficient manner, and the other to discuss the subjects mentioned in the letter of Drs. Carnochan and Whitney. But it would seem that almost all of the latter have been alluded to in the elucidation of the general vaccine question. It is therefore not only necessary to refer to the charges against human vaccine.

It is a very disagreeable as well as delicate task to criticize the opinion of one who has gained so much of the public confidence as Dr. Carnochan, and I can readily believe that the matter he endorsed may have been misrepresented to him; but I am impelled to discuss the paper further, because it represents the sentiments of a portion of the ignorant public who have been prejudiced against all kinds of vaccination, and also of a small portion of the practitioners of medicine who believe in vaccination; but whose ignorance of the laws of vaccine, struma, and syphilis, as well as their superstitious physiological opinions, are the cause of much of the suspicion as regards the effects of the vaccine vesicle. The assertions of failures and injuries by vaccination are not new; they have been continued by the ignorant and prejudiced ever since the days of Jenner. The writers for some empirical medical schools when discussing this subject, use nearly the same language, seeming to think that they could best increase the height of their domicile by lowering that of their neighbors. I can refer to two of the Herbalistic school, which decry vaccination, also to essays of Dr. Nittinger, of Stuttgart, of Dr. Bayard, of France, and of Messrs. Gibbs and Pearce, of England. The instancing in the letter, of twelve cases of variolous disease after reputed vaccination, does not constitute any authority, since we are not informed of the character of their former vaccinations, nor of their dates. I have no doubt that if eighth day lymph directly

from the arm, had been used upon them within five years, that they would have escaped; but, the cases, even as reported, argue much in favor of vaccination, since, as all recovered, they must have been modified by it; without vaccination, the mortality would have been about one-third. The letter, in short, advises first "a legal enactment prohibiting any use of human vaccine, and second, the establishment of a public institution for obtaining and furnishing vaccine virus solely from the cow, for use in the community, as well as for vaccinating the children attending our public schools." These two propositions are advised in the most confident manner and in the strongest language possible; as if their authors fully understood the subject, and believed the assertions (which constitute almost their only arguments), to be fully substantiated facts. Now sufficient has been stated on the preceding pages, to show that they know so little of the bovine virus, and that the assertions were mostly so directly contrary to the actual facts, that it is cause for wonder how they could be induced to affix their signatures to the document. They call for a radical change in the practice of vaccination for the following reasons: first, because the practice pursued for the last twenty-five years has not only failed to protect against Small Pox, but has also filled the city and country with "scrofula, syphilis, and other appalling forms of disease," and the second reason is, that the bovine virus as they say, is always easily obtained, always pure and innocent, and will always protect against epidemics of Small Pox. It is only necessary to say that in the foregoing pages all these reasons have been proved false and controverted, and it naturally follows that the radical change proposed by them is not called for.

All the mischiefs and failures in the use of human vaccine have been candidly admitted; but when traced to their sources, found to have been easily avoidable by the diffusion of proper knowledge, and perhaps by proper supervision on the part of the sanitary government. But the substance of the letter itself, in its unconscious betrayal of ignorance of medical science and pathology, in baseless "*ad captandum vulgus*" assertions, in its "*post hoc ergo propter hoc*" reasonings, in its assumption of rumors and theories for clearly demonstrated facts, and its entire absence of proofs and statistics, alone insures its condemnation. What else can we infer, when the sole authorities cited, the *Lancet* and the French report explicitly say, that the use of the bovine virus is as yet a mere experiment, not yet proved equal in its protection and its effects, clearly not as durable, regular and energetic as the human vaccine, and fails to take in fifty per cent in primary and eighty-four per cent in re-vaccinations, and yet they assert in the face of this, that the bovine vaccine is easy and harmless to use, and will protect most surely, and lastingly, against Small Pox. Had they been experienced vaccinators, the mere confession of this astonishing amount of failure would have led to the inference that there must be something wrong about the bovine vaccine.

Dr. Marson says, after over thirty years of experience in vaccinating:

"With good lymph and the observance of all proper precautions, an expert vaccinator should not fail of success in his attempts to vaccinate above once in one hundred and fifty times." My own experience in vaccinating in the same manner and with similar material as Dr. Marson's, leads me to say once in a hundred times. The returns of success for last year by the public vaccinators of England, published in the *Lancet*, show only one per cent of failures. The aggregate of those vaccinations was 461,000. According to the law, every one of these was inspected, recorded and a certificate given. Facts being entirely wanting to justify it, therefore, perhaps the only cause of the hasty conclusion of Drs. Carnochan and Whitney, and many others, that the cow stock must be perfection as regards protection against variola, and impossibility of injury arises from the derivation of its illogical name "vaccinia," which many suppose Dr. Jenner gave it, but his appellation was "variola vaccina." Now the argument is absurd and baseless that the subtle element which protects against Small Pox is any better on the heifer than on the child or the horse, merely because "vacca" means cow, and the principle in the virus is called "vaccine." Dr. Jenner never considered that the vaccine originated in the cow. Drs. Carnochan and Whitney, as well as others in France, England and elsewhere, jump at the conclusion that, as it seems impossible as yet to inoculate cows with indurated chancre, and also that as bad or ignorant management in vaccination from children is candidly admitted to have propagated it on a few occasions, therefore no possible harm could ever result from bovine vaccine, however imperfect it may be or improperly it may be used.

On the other hand, it has been demonstrated that every injury following the use of imperfect, badly developed, purulent, bloody virus, or that tainted with other secretions, would be much more likely to ensue from the general use of the bovine species for vaccinating the human race. The letter recommends the crust from the kine which is almost always so mixed with impurities, as to be the worst possible form of vaccine. Any pathologist or intelligent physician would hear with amazement that Drs. Carnochan and Whitney believed the following assertions given *verbatim* in the next twenty-five lines, and which occur in their letter: "The general objection to vaccination arises from the fact that much is improperly collected from unworthy and questionable sources, and through its vitiated character, various forms of scrofula, and other constitutional or malignant diseases are frequently introduced into families, who, prior to this process, were entirely free from such taint or development. Impure and worthless matter does generally, when used, produce a very bad sore, and inflicts injuries in a variety of ways." "Vaccine virus taken from the cow is perfectly free from syphilis, and other forms of scrofula with which it coalesces." Impure, tainted and vitiated virus causes the spread of syphilis, scrofula and other appalling forms of disease. Through the bovine virus it is absolutely certain that no taints or impurities could possibly be trans-

mitted. "It is well known, cases not unfrequently occur in practice where the arm becomes badly swollen, highly inflamed and exceedingly distressing showing a malignant character utterly unlike the normal condition of a vaccine sore. How can this distressing result be accounted for, if it be not from the transmission of some unexpected malignant disease, which in its development becomes more violent and controlling than the vaccinia, thus rendering its influence upon the system unprotective and useless."

The letter of the Eclectic Medical Society was sent to inform the Board of Health of their passage of three resolutions. The first of which was to the effect that no one should vaccinate a child without the parents' consent; the third recommended the establishment of a bovine institution, and the other consisted of the following remarkable language: "Resolved, That the subject of obtaining pure vaccine virus direct from the kine is one of very great importance, as matter thus obtained will prevent the spread of a variety of diseases—such as scrofula, syphilis, etc.—which almost universally follows the use of impure matter." Human vaccine is thus made the scape-goat of diseases and troubles, which generally ensue from the suffering party's or its parent's violations of physical laws, as well as the mal-practice and short-comings of some practitioners of medicine. It is also implied that a new Pandora's box of diseases has been opened upon the devoted human race.

The substance of the preceding quotations from the letters, together with the assertion that the bovine virus is sure and safe, repeated upon almost every page (without any particle of proof), comprises nearly the whole of the communications.

The last clause quoted above, directly says, that the virus alone, without any application, will prevent the spread of syphilis, scrofula, etc., also that after the human is used, the cow virus will still prevent the spread of the same disorders. We must either infer that the name alone of bovine virus is magical, or if not that these professors being, as the poet says, "most ignorant of that they're most assured," their unbounded confidence leads to a very careless mode of expression. The pathology of the quotations would be quite curious and unique, if it were only true. That vaccinal syphilis causes scrofula or coalesces with it, or causes any disease with which it coalesces, has never been proved. That impure, tainted and vitiated matter of any kind obtained through the medium of the vaccine sore and inoculated on the surface, causes scrofula cannot be shown.

Incidentally, pathologists would like to know with what diseases syphilis or scrofula coalesces? What other constitutional or malignant human diseases can be introduced into the system by superficial, cuticular inoculation, whether through vaccine or otherwise, besides syphilis and Small Pox?

Impure and worthless matter, according to European experiments on man and animals thus inoculated, generally in about 98 per cent., produces no effect at all; we would like to know their percentage of bad sores and varieties of injury. The letter has been charged with "*ad cap. vulg.*"

assertions, amongst others the following is known, as you say, to be entirely false: it says that the Board of Health "advise and admit the use of impure and tainted virus, and cause the same to be inserted into the arm of an innocent child by a compulsory process, without the consent of parent or guardian, and they therefore pray the 'Board' to abate and prevent the continuance of this flagrant wrong."

One of the sentences quoted means precisely the same as the declaration that all that follows an operation is always the result of it. Such phenomena as are described, only follow injury or violence to the sore or areola.

Does Dr. Carnochan impute all his pyemia and bad results after an operation to the knife alone? The implied theory of your correspondents that all diseases are inoculable or contagious, and manifest themselves in the same way, might be satisfactory to some, as it would set pathological observation at rest. However scientific men think that a vast field of research is yet before them in the investigation of the actions of morbid viruses. It may be observed, incidentally, that the patient and admirable experiments of Villemin, Colin, Chauffard, and other French and European pathologists on animals, in inoculating tubercle, pus, serum of the blood, non-organized blood, putrefying and other decomposable substances, as yet seem only to show that deep inoculations of the above matters into the circulation may form deposits in certain parts, and then give rise to purulent products capable of taking on a phymatoid form.

Many unjustifiable experiments have been made both in this country and Europe to inoculate tubercle, etc., upon mankind, but always with a negative effect. It might be repeated also that as much as 98 per cent. of attempted superficial inoculations into abrasions or upon the excoriated surface of the skin of all the above mentioned substances failed; and with tubercle the failures were complete. This difficulty of inoculation or absorption in the ordinary mode of vaccination which is only upon an abraded cutis, also accounts for the general absence of bad results when late, mixed or decomposing virus is used.

With this marvelous school of pathologists who say that so many diseases can be introduced by vaccination, there is no logical reasoning, nor safety in the practice of vaccination. They argue "that it is evident that on a syphilitic person every drop or portion must be poisoned, and that no lymph can be had without syphilis," then if it be proved that it can be taken at the right time and produce only vaccine, they answer, "Oh, that child's system upon which it was placed was strong, and happened to resist it." This might be called the latest popular theory of superstitious pathology. These professors seem to think a world of wisdom is contained in saying that "syphilis is terrible, far-reaching, omnipotent malady, extending through apparently healthy generations." If a medical man utters this oracularly, it only seems to augment the opinion of his wonderful skill in keeping the patient in even mediocre condition. With many it seems to be easier to profess these opinions than to study the natural history of the disease in the different tissues. It has no effect to change their views to

cite cases when pure lymph was taken from the vesicle, on an early day and used innocently on the whole of a large number, which, opened later, after it had become purulent or bloody, produced syphilis. These reasoners also think that almost any affection taints the whole system, and that if you do not get its full effect upon the inoculated subject you may still originate a sore or weakening result. When, it is asked, how then, dare you vaccinate at all? they answer, "It is not as bad as Small Pox, and the parents or patients must take the responsibility of possible harm;" then when met by the argument, "where you engraft syphilis, it may be worse than Small Pox," the answer is, "therefore we will have nothing but that from the cow." But even then their own theory cannot exempt them from inoculating disease or taints from the animal. Notwithstanding this "*reductio ad absurdum*," of any kind of vaccination, no admission or conviction follows. Their theory is also like that formerly held by some which declares all disease a unit only modified by the constitution of the patient and surrounding circumstances. Thus that which in one, may only cause urticaria, in another may give rise to pneumonia. That which in one causes measles, in another may cause whooping cough and so on, all "*prima facie*" absurdities.

It is well to observe before leaving this branch of the subject, that if constitutional syphilis were caused to so great a degree by vaccination as they would have us infer, it should be much more widely diffused than it is at present; it is the opinion of most physicians who have been a long time attached to dispensaries, that it has not increased in proportion to the rise in population. This kind of special pleading is also introduced, in one place in the letter. "The French report has fully established the fact, that the best course for the protection of the community is to return to Dr. Jenner's original proposition, the use of pure fresh virus from the kine only, which he affirmed to be perfectly reliable and permanent in its protective powers." Two mistakes occur in the foregoing; the report does not claim to have proved it and it was not Dr. Jenner's original proposition and practice. There is no obstacle in the way of law or popular opinion to prevent the establishment of bovine vaccine institutions, their greater lucrative character over other kinds of vaccine establishments has been the chief inducements in originating them, both in this country and in Europe. I have been informed of their existence in five cities in Europe. But the theory of the letter, that vaccine weakens by inoculated transmission, would render it exceedingly difficult to secure a constant fresh supply. They would need to keep agents watching for the disease in cows in various parts of the country, and when it was found it would often take too long a time to convey the animal to the institution. Upon whatever principle conducted, it would need very great care and skill to obtain the virus at precisely the best time—as if not so procured it would result in deplorable disappointment in failing to prevent Small Pox, and often also in manifold evils arising from the inoculation of mixed, tainted and decomposing matter. Another point should be considered in this connection, it is one of which

I have become convinced of late years, viz: the weakening of the whole stock by raising a great number of vesicles upon a single animal of whatever species. Instances have occurred in this country, where to realize the greatest profit, several hundred vesicles have been simultaneously made upon one cow; the result was obvious in a variety of ways, the ultimate, was a general diminution in the size of the crust.

Your query whether the vaccine of the dispensaries upon which the poor depend is generally as good as possible, has already been incidentally answered in the affirmative. The following figures show the amount of their work, and also that a year of extensive vaccination by them is always followed by a great diminution of Small Pox.

Table Showing the Mortality in New York City from Small Pox for the Last Fourteen Years, and also the Yearly Number of Dispensary Vaccinations during the same time.

Year.	Deaths from Small Pox.	Total Dispensary Vaccinations.
1854.....	586	10,729
1855.....	101	8,218
1856.....	388	12,274
1857.....	423	12,783
1858.....	527	14,390
1859.....	62	12,667
1860.....	287	17,416
1861.....	616	19,122
1862.....	269	18,408
1863.....	78	15,737
1864.....	394	18,843
1865.....	674	45,481
1866.....	35	8,726
1867.....	19	8,853

The number vaccinated at the Eastern Dispensary since its foundation in 1834, thirty-three years, was 129,128, and the number vaccinated by all the Dispensaries of this city since the practice was introduced, was 378,500; more than one quarter of a million of whom were vaccinated within the last quarter century.

I do not think that the poor could ever be persuaded to go to the stables or to the cow to procure the vaccination of their infants, instead of their present pleasant mode of selecting the "fine pock" from one of their own or their neighbor's healthy children and proceeding all together from one or more houses and witnessing the doctor at the dispensary perform the operation as at their request. This is the mode in which I vaccinate eighty per cent. of all who come to me for that purpose, or upon an average six thousand per annum; that is, from arm to arm.

We can fancy the outcry and return to the language of the opposition to Dr. Jenner, "My child shall not be inoculated from a filthy brute; I fear that horns would grow on it," etc. "What," they will say, "can be

expected from a bestial humor, but dreadful disease!" I have frequently been stopped when about to perform the operation by the question, what kind of poek is that you are using? When I answer cow-poek all business is arrested, and the parties interested refuse anything from a beast. It is an every day occurrence in busy vaccinating seasons, both at dispensary and Quarantine, that I am compelled to exclaim that "kine-poek" is only a name, and that my matter was derived from a long series of children.

And now having shown that human vaccination, as it should be practiced, will certainly prevent Small Pox more surely than anything else yet discovered, that the best human vaccine material in itself is entirely innocent, that its complications in a bad constitution or when violence is done to it are not only no aggravation of other diseases or injuries, but always infinitely less than those occurring with an attack of variola, that even with the vast amount of ignorance and carelessness with which it has often been performed it still seems to have been one of the most successful and harmless operations on record, and that bad results and failures are much more likely with the animal vaccine, it follows that no reform is necessary, except general diffusion of knowledge on the subject and an inoppressive supervision of the mode of operating and the character of the stock.

The concluding question as to what action is advisable is exceedingly difficult to answer, because although we may know very well what ought to be done, yet the necessary co-operation on the part of parents, guardians and governments will be found wanting in the majority. Two essential elements are needed to arrest Small Pox in this community; 1st, that all should consent to be vaccinated when necessary; 2d, the best vaccination necessary.

The first can not be obtained for several reasons; amongst others may be enumerated the tendency to neglect every thing which can be delayed, and the unwillingness to have it performed, resulting from ignorance and prejudice, much of which is caused by such popular appeals as the letter referred to, extracts from which have been published in influential newspapers. I have often seen this prejudice removed in a startling and melancholy way when Small Pox invades a family, taking the unvaccinated and leaving the others.

During the last epidemic of Small Pox in this city in 1864-65, a German woman came to me at the Dispensary in an excited manner, for vaccination, and in the midst of tears with a crowd waiting for the operation, uttered very nearly the following words: "You, doctor, vaccinated my oldest three children very nicely, but after that my husband got hold of a good-for-nothing book, written by a wicked, lying Frenchman, which said that vaccination was no good, and would make bad diseases, and we did not get the other three vaccinated, and now my beautiful baby is dead with Small Pox, and the doctor thinks the two others can't live; my oldest children have slept in the room with them and have not taken it. Why did the people who knew better ever allow such an awful bad book which has murdered my children to be printed."

I believe that a law was passed, at the instance of the State Medical Society, several years since, empowering public school trustees to refuse, if they chose, pupils who had not been vaccinated. This was a sign of progress; our popular government took the ground that none should share in the benefit of the public money without they would waive the popular right of suffering and spreading Small Pox if they pleased. Many opposed this law with various reasons; one of which was that it was contrary to the spirit of our institutions which advocated the greatest spread of universal education; and many parents would prefer that their children should remain ignorant rather than have them vaccinated. I recommended ineffectually a rather more stringent law at the time, viz: the requiring that all of the family should be vaccinated, from which any child was sent to public school, since children often conveyed the contagion to school without showing it themselves. The following is a copy of the plan, which, if carried out would secure the vaccination of nine-tenths of this community without any compulsory law.

I recommended that the Board of Education, or the Legislature, or whatever body was necessary, should pass or enforce an ordinance prohibiting the attendance in all the schools receiving any part of the public moneys, of any children who have not been well vaccinated, or variolated within seven years, or who cannot show a valid certificate to that effect, giving the date of the vaccination or variolation; and after a proper period of public notice, to prohibit the tuition of any children coming from any family where all the other members of that family above the age of three months cannot prove, or show a valid certificate of vaccination within that time, or of former variolation.

Also, that the Police Department cause all persons under their control, with their families, and all others who receive any benefit, such as lodging, etc., to be vaccinated, or to show a valid certificate or proof of vaccination or variolation within seven years;

Also, that measures be taken for the passage of a law compelling the vaccination of every prisoner, and of his or her vaccination, shortly before discharge, provided the term of incarceration shall be prolonged more than two years from the time of former vaccination;

Also, that the Commissioners of Charities and Correction, as well as all other public bodies having the care of the poor, comply with the above rule in all institutions under them, and withhold all in and out-door relief of any kind, until vaccination is performed, or the dates of previous vaccination ascertained.

In view of the increasing neglect, a proclamation to the people should be issued without delay, stating the necessity of vaccination and re-vaccination, and recommending the Dispensary for the poor. I would also respectfully recommend the calling of an honorary commission of leading pathologists and vaccinators to decide what shall constitute a test certificate of vaccination. Many physicians interested in the welfare of the com-

munity think that the example of the wise and liberal Parliament of England should be followed, who, after obtaining all the testimony of Dr. Simon's report, passed a mild compulsory law to the effect that a fine, etc., should follow the neglect of vaccination by parent or guardian.

The task of elucidating the phenomena and benefits of vaccination has been a labor of love to me. I regret that full justice has not been done to the subject, and have constantly desired that some one might be found to undertake it with greater literary experience and power of description, and with as much knowledge of the vaccinia as I have been compelled to acquire. I cannot help concluding with the expression that the more one knows of the subject, the more his admiration will be excited, not only with the contemplation of the vast benefit that Jenner's discovery has conferred, but with the fact that the science should have been perfected in the God-like mind of one single man, and, like Minerva from the brain of Jove, should have entered upon its career complete and perfect as soon as the press gave birth to his first book upon the subject, A. D. 1798, since which time writers upon it have only been able to submit the "*res-gesta*," or numbers protected, and, on account of its deceptive simplicity, perform the common though necessary duties of reviewers and commentators. It must not be inferred that this great scheme burst suddenly upon the mind of Doctor Edward Jenner, as the theory of terrestrial gravitation is said to have fallen suddenly upon Sir Isaac Newton. No; like that of the illustrious Harvey, on the circulation of the blood, it may be said to have been a life-long work. The great John Hunter well remembered in after years that Jenner, when a student at the hospital in London, broached the subject to him. This young physician, with brain pregnant of vast benefits to mankind, having rural tastes, settled in the country. He was always a diligent student of Natural History and Zoology, and by an essay on the habits of a variety of birds, became a fellow of the Royal Society of British Science. His observing mind took early cognizance of the fact that many of those who had the care of horses and the milking of cows, and had contracted sore hands from eruptions on the animals, were protected against Small Pox. This led him to study and experiment upon the eruptive diseases of animals for many years, and in May, 1796, he made his first public trial by vaccinating a little boy from a vesicle on the hand of a girl contracted from another on the udder of a cow, and in about seven weeks thereafter, showing that the inoculation of genuine Small Pox virus had no effect upon him; but it was not until two years later, after he had vaccinated some hundred children, and put them, at different intervals, to the test of failure for Small Pox with "the point of a lancet," that he sent forth his first book announcing his discovery to the world, a remarkable "unveiling of Truth in the fulness of time." The practice of vaccination was confidently recommended in less than two years afterwards by all the eminent practitioners of London. Dr. Woodville, physician to the Small Pox Hospital, in six months vaccinated 3,250 persons, and afterward inoculated them with Small Pox matter without the slightest effect in any

one instance. Such was the experience of only one institution ; but during that time the same remarkable and astounding experiments and phenomena were being repeated in all the States in Europe and civilized America, and it has been estimated that more than 150,000 were thus proved to be completely protected. I cite this to show that the progress of this new invention met with less opposition and spread with greater rapidity than any other discovery, merely because the proofs were so overwhelmingly conclusive, and its performance was intrusted to intelligent practitioners.

And now, having thus far endeavored to enhance the professional appreciation of this greatest of remedies—this sovereign of antidotes—this magnificent preventer of more than half a million of premature deaths every year—I cannot conclude more appropriately than by quoting from your own letter to me, "that none can be justified in proclaiming their hostility to vaccination, because the withdrawal of public confidence in its efficiency will surely result in re-instating the dreadful plague which formerly threatened to depopulate the world."

I remain, with many thanks for the honor conferred upon me by your letter,

Yours, most respectfully,

J. P. LOINES, M. D.,

House and Vaccine Physician of the Eastern Dispensary.

"H."

REPORT OF SANITARY COMMITTEE

ON THE

MEANS FOR PREVENTING DROWNING.

The Sanitary Committee to whom was referred the following resolution :

Resolved, That in view of the large and increasing number of deaths by *drowning*, in the Metropolitan District, as appears from the weekly report of the Registrar of Vital Statistics, the Sanitary Committee, be requested to report whether any, and what, measures can be adopted by this Board to diminish the number of such casualties in the Metropolitan District.

Respectfully report that they have carefully examined into the subject therein referred to, and that it appears to be very desirable not to delay the needed action thereon.

In 1806, the "Humane Society of New York," which had existed as the "Society for the Relief of Distressed Debtors," since 1787, resolved to devote a portion of its care to the resuscitation of persons apparently dead from drowning. It accordingly provided several sets of apparatus for this purpose, and appointed physicians to take charge of them and give the requisite medical aid. It prepared "certain plain and brief directions to be pursued in cases of this kind."

The ease with which drowning persons are rescued when the requisite means are at hand, and the possibility of resuscitating those apparently dead from drowning when proper methods are skillfully and promptly employed, have long since arrested the attention of philanthropists, and led to organised efforts to diminish these casualties and their fatal results. The London Royal Humane Society for recovering the apparently drowned or dead, was established as early as 1774, and the statistics of its operations show that during the ninety-four years of its existence, it has done incalculable service among this class of unfortunates. In the year 1862, for example, of 171 cases treated 156, or 91.2 per cent recovered, although twenty-seven were attempted suicides.

The National Life Boat Institution, of England, is organized as a coast guard for the purpose of rescuing drowning persons in British waters.

Its operations are conducted according to fixed rules, and its members are thoroughly trained in the execution of all its methods of rescuing and resuscitating the drowned.

A member of this institution informs us that great numbers of drowned are rescued and restored annually by this association.

In most European seaboard and river towns organizations exist for the recovery of drowned persons, and the results of their labors prove the necessity of such humane efforts.

The exposure of the inhabitants of the Metropolitan District to accidental drowning is very great. Its water sides have been computed to extend 167 miles, and along the shores is conducted every form of trade and manufactory.

The necessary intercommunication between business centres and places of residence is largely by means of water transportation. The number of persons who crossed the New York ferries last year, according to the returns of the ferry companies, amounted to the enormous aggregate of about 80,000,000.

It could scarcely fail to happen that even with the best conducted ferries accidental drowning would frequently occur in the transit of this immense multitude. But the best proof of the liability of the population of this District to drowning is seen in the weekly reports of the Registrar of Vital Statistics.

The number of deaths in New York alone frequently averages one per day by drowning. During the years 1863-7 there were no less than 1,059 deaths from this cause in New York, exclusive of suicides.

The following very instructive table, compiled from the Police Records, under the direction of Dr. Harris, exhibits the number of cases of drowning during six months of 1867, with an analysis of the results, their distribution among the precincts, &c., &c. :

Precinct	Number of cases	Number of deaths	Number of recoveries	Number of persons rescued
1st	12	8	4	12
2nd	15	10	5	15
3rd	18	12	6	18
4th	20	14	6	20
5th	22	16	6	22
6th	25	18	7	25
7th	28	20	8	28
8th	30	22	8	30
9th	32	24	8	32
10th	35	26	9	35
11th	38	28	10	38
12th	40	30	10	40
13th	42	32	10	42
14th	45	34	11	45
15th	48	36	12	48
16th	50	38	12	50
17th	52	40	12	52
18th	55	42	13	55
19th	58	44	14	58
20th	60	46	14	60
21st	62	48	14	62
22nd	65	50	15	65
23rd	68	52	16	68
24th	70	54	16	70
25th	72	56	16	72
26th	75	58	17	75
27th	78	60	18	78
28th	80	62	18	80
29th	82	64	18	82
30th	85	66	19	85
31st	88	68	20	88
32nd	90	70	20	90
33rd	92	72	20	92
34th	95	74	21	95
35th	98	76	22	98
36th	100	78	22	100
37th	102	80	22	102
38th	105	82	23	105
39th	108	84	24	108
40th	110	86	24	110
41st	112	88	24	112
42nd	115	90	25	115
43rd	118	92	26	118
44th	120	94	26	120
45th	122	96	26	122
46th	125	98	27	125
47th	128	100	28	128
48th	130	102	28	130
49th	132	104	28	132
50th	135	106	29	135
51st	138	108	30	138
52nd	140	110	30	140
53rd	142	112	30	142
54th	145	114	31	145
55th	148	116	32	148
56th	150	118	32	150
57th	152	120	32	152
58th	155	122	33	155
59th	158	124	34	158
60th	160	126	34	160
61st	162	128	34	162
62nd	165	130	35	165
63rd	168	132	36	168
64th	170	134	36	170
65th	172	136	36	172
66th	175	138	37	175
67th	178	140	38	178
68th	180	142	38	180
69th	182	144	38	182
70th	185	146	39	185
71st	188	148	40	188
72nd	190	150	40	190
73rd	192	152	40	192
74th	195	154	41	195
75th	198	156	42	198
76th	200	158	42	200
77th	202	160	42	202
78th	205	162	43	205
79th	208	164	44	208
80th	210	166	44	210
81st	212	168	44	212
82nd	215	170	45	215
83rd	218	172	46	218
84th	220	174	46	220
85th	222	176	46	222
86th	225	178	47	225
87th	228	180	48	228
88th	230	182	48	230
89th	232	184	48	232
90th	235	186	49	235
91st	238	188	50	238
92nd	240	190	50	240
93rd	242	192	50	242
94th	245	194	51	245
95th	248	196	52	248
96th	250	198	52	250
97th	252	200	52	252
98th	255	202	53	255
99th	258	204	54	258
100th	260	206	54	260

Summary of Records of Drowning reported by Metropolitan Police Officers in their Morning Reports, in the cities of New York and Brooklyn, for the six months ending October 31st, 1867.

MONTHS.		Rescued alive.	Rescued dead.	Others (bodies not recovered.)	Bathers (included in one of the three foregoing classes.)	Total.
May		13	11	4	.....	28
June		6	21	6	4	31
July		15	21	6	4	42
August		17	25	7	6	49
September		14	12	1	1	27
October		18	10	1	.....	29
Total for six months		82	100	24	15	206

PRECINCTS.	Total in each precinct.	Remarks.
1st	7	The body of one person was not recovered.
2d	4	One person committed suicide; the body was not recovered.
3d	14	One person attempted suicide but was rescued. One drowned while bathing.
4th	20	One person drowned by falling into the water while intoxicated. The bodies of two persons were not recovered.
5th	11	Three persons drowned in consequence of falling into the water while intoxicated.
7th	12	While bathing one; body not found. Suicide, 1. Bodies of two additional persons not recovered.
9th	6	One drowned while bathing.
11th	13	Suicide, 1. Two bodies not recovered.
12th	5	Body of one person not recovered.
13th	8	Person attempted suicide but was rescued.
16th	4	Body of one person not recovered.
18th	11	Suicide, 1. Attempted suicide, 1. While bathing, 2. One body not recovered.
19th	6	Body of one person not recovered.
20th	6	Insane man attempted suicide, but was recovered.
21st	6	Suicide, 1. Attempted suicide, 1. While bathing, 2.
22d	5	Two persons perished while bathing.
23d	12	Two persons perished while bathing. Attempted suicide, 1. Two bodies not recovered.
24th	7	Two bodies not recovered. Intoxication, 1.
26th	5	
27th	11	Attempted suicide, 1. Five men drowned by sinking of sloop—consequence of collision.
28th	12	
30th	5	Attempted suicide, 1. While bathing, 1.
31st	9	Intoxication, 1. Prostitute committed suicide by drowning.
32d	7	Body of one person not found. While bathing, 1.

In view of these facts it becomes a matter of the first importance that easy practicable means be employed to diminish the liabilities to accidental drowning, and to recover those who are victims of this accident. Happily the measures adopted to secure these results are readily obtained and are inexpensive.

They consist of: 1st, the collection and preservation of the proper apparatus at those points where these accidents are liable to occur; and, 2d, a class of men, thoroughly instructed in the use of this apparatus and the practical application of approved methods of resuscitating those apparently dead.

The points of greatest exposure to drowning, are 1st, at the ferries and steamboat landings; and, 2d, at those water sides where bathers congregate in largest numbers.

The fifteen ferries that communicate with the city of New York have no less than forty-five stations and ferry houses and docks within the Metropolitan District, and they employ no less than eighty-three steamboats. The subjoined table shows their distribution:

Name of Ferry.	Boats employed.	No. of docks and ferry houses.	Total passengers transported in 1866.
Union Ferry to Brooklyn.....	17	10	40,000,000
Peck Slip and Grand street to Brooklyn.....	13	4	4,100,000
Jackson street to Brooklyn.....	1	2	1,800,000
Houston street to Brooklyn.....	3	2	1,920,000
Tenth street and Greenpoint.....	4	2	1,500,000
Thirty-fourth street and Hunter's Point.....	5	2	2,300,000
Ninety-second street and Hell-Gate.....	2	2	125,000
West Forty-second street and Weehawken.....	2	1	360,000
Spring and Christopher streets to Fort Lee.....	2	2	780,000
Christopher and Barclay streets to Hoboken	10	2	5,300,000
Pavonia, foot of Chambers street.....	4	1	3,390,000
Deboeses and Cortland streets to Jersey City..	8	2	13,000,000
Dey street and North Shore, Staten Island.....	3	4	1,050,000
Liberty street and Central Railroad, N. J.....	5	1	2,100,500
Whitehall street and Staten Island.....	3	4	2,200,000
East River and Bay Ridge.....	1	3	.....
Total.....	83	44	79,925,000

Experience at each of the ferry houses has proved that the most important appliance for most of the rescues that are made at those places is a light ladder. Most of the ferries have such ladders. Cork floats, on ropes in the water, or suspended near by the bridge, have been found useful, and a few of the ferries have them.

The policemen stationed at ferries, and at other places by the water sides, all coincide in the statement that a coil of light rope, with a knot or light weight at the end, is the most essential thing to aid them in rescuing persons in the water. Some of these water-side officers have repeatedly expe-

rienced the want of this simplest of all aids, and say they have had to climb up upon the nearest ship in the docks and cut a lanyard, or seize some other light rope for the purpose; and even then—though greatly delayed—have succeeded in throwing the cord in time to rescue the drowning person who has seized it.

Experiments tried by officers of the Harbor Police in the presence of the Registrar and the Sanitary Engineer have proved that twelve or fifteen fathoms of rope plainly coiled is readily thrown its full length before striking the water. The committee would here express their obligations for the aid rendered by the Sanitary Engineer and the Registrar of this Board in the very careful investigation they have given to the subject by personal inquiries at the ferries and docks. They have the pleasure to report that the police officers and others by the water side have given much valuable information and practical suggestions. To Dr. Harris we are indebted for characteristic completeness and thoroughness of investigation upon this subject and the means for remedying the evils.

RESUSCITATION.

The methods of resuscitating drowning persons, though simple, require, on the part of the operator, practical knowledge and skill in their application. They are to be promptly put into execution, and persevered with faith in eventual success. These methods can be taught to any person of ordinary intelligence in a very few lessons. As an example, we may refer to those officers of the Central Park, who were selected for this purpose; after a few lessons, they performed the manual with satisfaction, precision, and promptness.

In the selection of persons for instruction in the methods of resuscitation it is desirable to choose such persons as are permanently on duty at the points where there is the greatest liability to these accidents. The following classes of officials are at once suggested:

1. The police officers stationed at the several ferries. These officers have in general been long attached to this service, and are familiar with every danger at these stations. They are always present on the arrival and departure of each boat, and hence are in a position to employ at once the means of rescuing and apply the methods of resuscitation.

2. The bridge masters are still more immediately at the scene of the accident if it occurs at a ferry. They are always on the bridge on the arrival and departure of each boat, and can even more promptly than the police officers rescue those in the water. The police officer and bridge master could co-operate with each other in resuscitating the asphyxiated.

3. The harbor police who patrol the water fronts are in a position, as the records of their service show, to give most effectual aid in recovering and restoring the drowned. From the water they have opportunities of witnessing these casualties along the docks, and by means of their small boats always afloat and well manned, they are enabled to reach the drowning per-

son in time to rescue and resuscitate, provided they have the requisite means at hand and understand their application.

4. Men engaged on permanent duty at piers where steamboats regularly land and receive their passengers, as at the various landings of the river and sound boats, the pier at Bellevue, &c., &c.

CONCLUSIONS IN REGARD TO RESCUE AND RESUSCITATIONS.

(1.) That every ferry house and every ferry boat within the Metropolitan District, and especially the harbor police boats, be regarded as a rescue station.

(2.) That at certain points by the water side there shall be rescue stations established under the supervision of the Sanitary Engineer and be placed in charge of the Metropolitan police. The number of these stations may be determined hereafter on a more careful investigation, but there is urgent necessity for locating the following immediately, viz :

At Coenties slip.

At Old slip.

At Sectional dock, near Pike street.

At Dry dock.

At foot Sixteenth street, East river.

At Bellevue.

At foot of One Hundredth and Tenth street, East river.

At Manhattanville.

At foot of Thirty-fourth street, North river.

At pier 1, North river.

At Whitehall or pier 1, East river.

At Harlem bridge.

At foot of Fifty-second street, North river.

At Canal street, North river.

At Castle Garden.

(3.) At the proper points along the water side of Brooklyn, Staten Island, Westchester and Queens counties the authorities should designate desirable places for rescue stations and the simple apparatus for saving drowning persons.

(4.) Every rescue station should be suitably designated and publicly known by means of a published catalogue.

(5.) Every rescue station should be furnished with the approved apparatus, viz : the coils of light rope (cords), a life preserver with a stout cord attached, a stout light ladder, and such other appliances as experience shall hereafter indicate as desirable or necessary.

(6.) All the apparatus should have a particular and most accessible place and mode of storage, fastened in position without locks or needless impediments, and should be indelibly inscribed with these words : "*For the Rescue of Drowning Persons.*" And upon a sliding card, adherent to a firm tablet, and fastened by a cord of sufficient length, there should be a

printed copy of the *Rules for Saving the Drowned*. The place or open case for this storage should be designated in plainly painted words, "*For Rescuing Drowning Persons*," and let each station be separately numbered.

(7.) Each station and all its apparatus should be under the care of the Metropolitan police officer on duty nearest to it, and it should be the duty of all police officers to give special attention to the safe keeping and to the timely use of all the apparatus contained therein.

But every person who has opportunity to rescue the drowning should be authorized to employ whatever apparatus he can find at a station, though such persons should strictly obey the requests of the policeman on duty at the place where the apparatus is found or is used.

RESUSCITATION.

(1.) In order to impart the best practical instruction to the persons whom we have herein designated as most available for the rescue and resuscitation of drowning persons, the following means seem to be necessary:

(a.) The *Rules for Saving the Drowned* must be printed upon convenient cards, and be supplied to the proper persons about the ferries and docks, as well as be widely and appropriately published and distributed. And especially should these instructions be posted and distributed in a proper way at all waterside places of public resort.

(b.) At each ferry-house station, and upon the harbor police boat, as well as at certain other rescue stations, there should be a *drill* for teaching the manual or method of manipulation for *resuscitating* the persons rescued from the water. The best method can be taught upon a voluntary subject (man) in a single *drill*, or, at the most, in two *drills*.

(c.) Every Police Surgeon and every Sanitary Inspector should be instructed by their respective superiors in authority to go instantly upon any call by the police to attend and aid in the resuscitation of the drowned. Any physician near the place of rescue should go when called to aid in resuscitating a person, and he should, as a physician, receive honorable mention and public thanks for his response to such calls.

(d.) It is earnestly recommended that the Sanitary Inspectors and the Police Surgeons shall thoroughly acquaint themselves with the two methods for resuscitation, known as Marshall Hall's and Silvester's, and that Silvester's method shall (at first) be taught to the water-side police and others, and be posted and distributed for public utility. This is the most readily learned and easily practiced method; but a physician may in certain cases succeed best by using Dr. Marshall Hall's method.

RULES FOR RESUSCITATING OR SAVING THE LIFE OF THE DROWNED.*

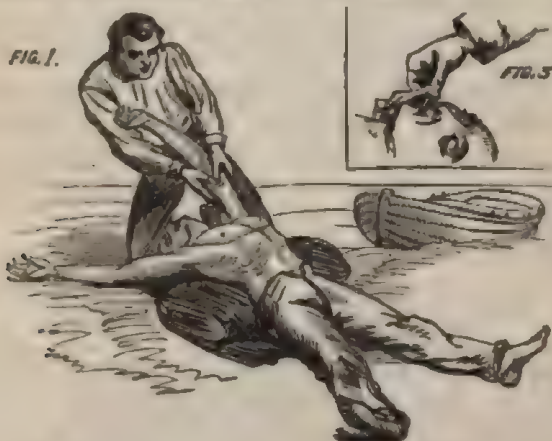
Remember that the patient must be treated instantly, and on the spot where rescued. He must be freely exposed to the open air; loosen the

* This section [Rules] of the Committee's report was printed and distributed for popular use.

clothing so as to freely expose the neck and chest. All persons not needed for saving him should avoid crowding about.

- (1.) Let the throat and mouth be cleansed by placing the patient gently face downward, with one of his wrists under his forehead. Quickly wipe and cleanse the mouth, and, if the patient does not breathe, immediately begin the following movements:
- (2.) *Posture.*—Place the patient on his back, with shoulders raised, and supported easily on a folded coat or some kind of pillow.
- (3.) *To Keep up a Free Entrance of Air into the Windpipe.*—Let one person, at the patient's head, grasp the tongue gently and firmly with his fingers, covered with a bit of handkerchief, and drawing it out beyond the lips; then either hold it, or press the under jaw (chin) up so as to retain the tongue protruding from the mouth; but it is better to hold it in that position with the hand.

These engravings show how to give *breath* to a person rescued from the water and apparently dead. The posture in which the patient is to be laid (face down and wrist under the forehead) for a moment, soon as he is taken out of the water, is not shown here (*See 1st Rule*).



The movements here shown for one side of the patient must be made on both sides by two persons working together.

These *figures* show how one of the two men works.

Figure 1 shows the long and strong pull, for opening the chest to let fresh air in.

Figure 2 shows how to make the strong side and front pressure to drive the air out of the lungs.

Figure 3 shows how the tongue is to be held.

(4.) *To Produce and Imitate the Movements of Breathing*—Raise the patient's extended arms upwards to the sides of his head, and then pull them steadily, firmly, slowly, outwards. Next turn down the elbows by the patient's sides, and bring the arms closely and firmly across the pit of the stomach, and press them and the sides and front of the chest gently but strongly for a moment, then quickly begin to repeat the first movement.

(5.) Let these two kinds of movements be made very deliberately and without ceasing until the patient breathes, and let the two movements be repeated about twelve or fifteen times in a minute, but not more rapidly, remembering that to thoroughly fill the lungs with air is the object of the first or upward and outward movement, and to expel as much air as possible is the object of the second or downward motion and pressure. This artificial respiration should be steadily kept up for forty minutes or more when the patient appears not to breathe; and after the natural breathing begins, let the same motion be very gently continued, and let the proper stimulants be given in the intervals.

WHAT ELSE IS TO BE DONE, AND WHAT IS NOT TO BE DONE, WHILE THE MOVEMENTS ARE BEING MADE.

If help and blankets are at hand have the body stripped, wrapped in blankets, but not allow the movements to be stopped. Bystanders can supply dry clothing. And the assistants should briskly rub the feet and legs, pressing them firmly and rubbing upward, while the movements of the arms and chest are going on. Apply hartshorn or a feather within the nostrils occasionally, and sprinkle or lightly dash cold water upon the face and neck. The legs and feet may be rubbed and wrapped in hot blankets, if blue or cold, or if the weather is cold.

WHAT TO DO WHEN THE PATIENT BEGINS TO BREATHE.

Give brandy by the teaspoonful or hot sling two or three times a minute, until the beating of the pulse can be felt at the wrist, but be careful and not give more of the stimulant than is necessary. Warmth should be kept up in the feet and legs, and as soon as the patient breathes naturally, let him be carefully removed to a house, and be placed in bed, under medical care.

ANOTHER METHOD—MARSHALL HALL'S.

This Method is most Useful After the Other has Become Wearisome.

First.—Treat the patient instantly on the spot in the open air, freely exposing the face, neck, and chest to the breeze, except in severe weather.

Second.—In order to clear the throat place the patient gently on the face, with one wrist under the forehead, that all fluid and the tongue itself may fall forward, and leave the entrance into the windpipe free.

Third.—To excite respiration, turn the patient slightly on his side, and apply some irritating or stimulating agent to the nostrils, as veratrine, dilute ammonia, etc.

Fourth.—Make the face warm by brisk friction; then dash cold water upon it.

Fifth.—If not successful lose no time, but to imitate respiration place the patient and turn the body gently, but completely, on the side, and a little beyond: then again on the face, and so on, alternately. Repeat these movements deliberately and perseveringly fifteen times only in a minute. When the patient lies on the thorax, this cavity is compressed by the weight of the body, and expiration takes place. When he is turned on the side, this pressure is removed and inspiration occurs.

Sixth.—When the prone position is resumed, make a uniform and efficient pressure along the spine, removing the pressure immediately before rotation on the side. (The pressure augments the expiration, the rotation commences inspiration.) Continue these measures.

Seventh.—Rub the limbs upward with firm pressure and with energy. (The object being to aid the return of venous blood to the heart.)

Eighth.—Substitute for the patient's wet clothing, if possible, such other covering as can be instantly procured, each bystander supplying a cloak or coat, etc. Meantime, and from time to time, to excite inspiration, let the surface of the body be slapped briskly with the hand.

Ninth.—Rub the body briskly till it is dry and warm, then dash cold water upon it and repeat the rubbing.

Avoid the immediate removal of the patient, as it involves a dangerous loss of time; also the use of bellows, or any forcing instrument; also the warm bath and all rough treatment.

If the weather be very cold, and the situation exposed, a tolerable shelter should, if possible be secured; and in extremely cold weather it may be necessary to perform the rubbing and rotating movements, with the body loosely covered with dry blankets, coats, or something of the kind.

The treatment described in these Rules, (by one, or—successively—by both of the methods), should be persevered in for some hours, unless the patient is positively known to be dead. Persons have been restored after several hours of steady treatment in this way.

New York, September 30th, 1868.

To the Sanitary Superintendent:

Sir—I have the honor to state that pursuant to your instructions I commenced, on the seventeenth of July, a course of instruction of the Metropolitan Police upon "The Rescue and Resuscitation of Drowning Persons."

First, the sergeants were assembled in appointed numbers at the Headquarters of the Metropolitan Police until ninety-two of them, being chiefly those stationed at the precincts including the water front, had duly attended. The theory of artificial respiration was explained, aided by anatomical sketching upon the skin of a man stripped for the occasion; the various steps in each method of inducing artificial respiration were fully demonstrated; then, each sergeant was made to practice for himself every detail of each method taught upon one of their own number. Subsequently, instruction was given to many of the patrolmen, who assembled by platoons according to previous appointment at their respective stations. In consequence of the much larger number in attendance upon these lectures, it was impracticable to pursue the same course of personal training as was adopted with the sergeants; very full demonstrations were however given, and a certain number of the men were called upon at each meeting to repeat the more important steps of each demonstration.

Whatever doubt may at any time have been felt respecting it, the probability of eliciting the interest of policemen in the scientific methods of resuscitation may be best attested by the fact that during every lesson the men have been not only thoroughly attentive but enthusiastic, so that afterwards they have frequently been seen practicing upon each other the various methods of artificial respiration.

That some degree of practical proficiency may be acquired by policemen from such instructions is proven by the fact that Jeremiah Mahoney, patrolman of the fourth precinct, who for the first time heard of the subject at one of these lessons about two weeks before, proceeded promptly to practice artificial respiration in the case of an apparently lifeless body at the foot of Bridge street, and after faithful persistence for about thirty-five minutes succeeded in establishing perfect resuscitation and recovery. (Vide Special Report to Sanitary Superintendent, dated September 21, 1868).

The methods of artificial respiration which have been taught are the *indirect* methods of Drs. Sylvester and of Marshall Hall, and, in addition, the *direct* method as described by myself. The former methods are fully described in pamphlets issued by the Board. The latter method, however, has been so much more readily learned by the men, has proved such an easy key to the entire principle, and in the demonstrations has uniformly induced a compulsory gasp so much more decidedly than the other methods, that I submit the following brief directions for resuscitation as essential to the completeness of this report.

To clear the Mouth and the Track to the Lungs—On recovery from the water, instantly rip or cut all clothing free from about the waist. Stretch

the body on the ground upon its face, its right wrist beneath its forehead, and a large hard roll of clothing beneath the pit of its stomach. Enwrap your right forefinger and thumb with your pocket-handkerchief with which to mop out the mouth, seize the tongue and hold it out while an assistant presses for half a minute with all his weight upon that part of the back over the roll of clothing. This position gives complete drainage from the stomach and chest to the mouth. The pressure forces out accumulations in the stomach and throat, and so clears the track for the air to reach the lungs.

This, so far, is but one step preparatory to artificial breathing and should not occupy over one minute.

The position of the Body for Artificial Breathing.—Quickly turn the body upon its back, with its arms beside its head, and the hard roll of clothing placed beneath the ribs, so as throw the pit of the stomach as prominently forward as possible. The tongue must be kept held out as before during all the future steps until recovery.

The Position of the Operator.—Kneel astride the body facing its head. Place the palms of your hands upon the most prominent part of the ribs just below the pit of the stomach, so that your fingers fit into the grooves between the short ribs at the fore and lower part of the chest. At the same time keep your elbows firmly against your sides.

The Motions of the Operator.—Now, using your knees as a pivot, throw your whole weight forwards, and at the same time grasp the waist, squeezing its sides together and upwards as if you wanted to force the contents of the chest out of the mouth. Let this motion occupy you while you slowly count one, two, three. Then suddenly let go. Count once more, which is four. That allows time enough for the ribs to spring back into place. Then begin again repeating the motions as before to the time of one, two, three, four—one, two, three, four, making each set of motions about ten or fifteen times a minute.

This is the entire process of artificial breathing, and it must never be forgotten that this is the first and chief, if not the only, reliance. In this way you make the body breathe until it is able to take a breath for itself.

Other Means of Help.—While the breathing is being done for the body it should be stripped and each limb be thoroughly well rubbed with the warm hands of some bystanders.

As soon as the patient begins to breathe naturally, which may occur in from five to sixty minutes, give a teaspoonful of brandy and water or other stimulus every five minutes, continuing the friction for about a quarter of an hour longer, after which it is better to put the patient to bed wrapped in warm blankets with plenty of fresh air to breathe.

This method possesses the following advantages over and above either of the other methods previously mentioned: 1st. It is more simple. 2d. The degree of compression is felt, and can be regulated by the operator. 3d. All the available anatomical means for displacement of air in the cavity of the chest are completely used. 4th. While

the necessary motions are in progress, the tragus may be steadily held out, the limbs and entire body be dried and warmed without interfering with the operator. 5th. No time is lost in superfluous motions. 6th. It is less fatiguing to the operator. 7th. It is more quickly taught to a bystander.

These lectures have been given at irregular periods, as other duties would permit, and were discontinued on the 30th instant.

Within the Metropolitan District are more than one hundred miles of water front; there are forty-four ferry stations; eighty-one ferry boats plying and carrying 79,925,000 persons annually.

The average number of deaths from drowning is two hundred and twelve (212) per annum.

The means hitherto employed to prevent death from drowning, and but recently inaugurated by your Honorable Board, have consisted of one temporary course of instruction on "The Rescue and Resuscitation of Drowning Persons," as above mentioned, and the lessons have been attended by eight hundred and nineteen (819) policemen, ninety-two of whom are sergeants; the supply of the Board's rescue apparatus, consisting of ladder, pike and heaving line, to twenty-four points at the lower part of the city; and the distribution of printed circulars entitled "Rescue of Drowning Persons."

I beg respectfully to submit that the great annual mortality from drowning might suggest the economy of adopting a system of practical instruction for the rescue and resuscitation of drowning persons which should be constantly maintained and become permanently established.

I have the honor to be, very respectfully, your obedient servant,

BENJAMIN HOWARD, M. D.,

Assistant Sanitary Inspector.

NOTE.—At the date of the printing of this report, January 13th, 1869, twenty-five persons, during the preceeding five months, have been rescued from drowning by the agencies of the Board.

"RESCUE STATIONS."

1. Pier No. 1, North river, full set, South side.
 2. Pier No. 10, North river, pole and ladder.
 3. New Jersey Central, in ferry-house, pole and ladder.
 4. Pier 43, North river, pole and ladder.
 5. Pier 47, North river, full set, south side.
 6. Hoboken Ferry, full set, north side.
 7. Foot Gansevoort street (dumping grounds), full set.
 8. Foot Cortlandt street (inside), full set.
 9. Pier 29 (Nicaraugua office), rope.
 10. Pavonia Ferry (north end track-boat), full set.
 11. Foot Harrison street (over Babbitt's sign), full set.
 12. Desbrosses Street Ferry (on fence), full set.
 13. Grand Street Ferry (inside), full set.
- Grand Street Ferry (south side), ladder and pole

14. Gouverneur Slip, rope.
15. Foot of Clinton street (floating dock), rope.
16. Foot of Rutgers street (N. Y. balance dock), ladder, rope and pole.
17. Catherine Street Ferry, south side (inside), full set.
18. Roosevelt Street Ferry, north side (inside), full set.
19. Pier 24, Hartford Pier, outside, south side, full set.
20. Fulton Ferry-house, full set.
21. Wall Street Ferry-house, full set.
22. Pier 12, pole and rope.
23. Coenties Slip, north side, ladder and short pole.
24. Coenties Slip (south side, over Boar's store), full set.
25. South Ferry, Pier 1, inside, full set.
26. Bridge street, Brooklyn.
27. Staten Island, south side.
28. Staten Island, north side.
29. Yonkers, full set.
30. Astoria, full set.
31. Hunter's Point, full set.
32. Greenpoint, full set.
33. Houston street, New York, full set.

“ I. ”

REPORT

OF THE

REGISTRAR OF VITAL STATISTICS.

METROPOLITAN BOARD OF HEALTH, }
BUREAU OF VITAL STATISTICS, Nov. 15th, 1868. }

To the Secretary of the Metropolitan Board of Health:

In presenting the third annual report of the Bureau of Vital Statistics, the Registrar would remark that, in accordance with the wishes of all who are interested in the study of such records, the consolidated abstracts for the twelve months will conform to the registrations in the calendar year. But this arrangement for the yearly tabulations shall not prevent the Board of Health from receiving in advance the summaries of the vital statistics for consecutive months and quarters of the year in the forms that have obtained approval in the two former reports.

Our second annual report showed that in the year which ended on the 31st of December, 1867, there were 23,159 deaths in the city of New York and 8,598 in Brooklyn. Also, that in the twelve months ending the last of September in that year there had been 23,443 deaths in the former and 8,589 in the latter city.

In the first nine months of the year 1866 there were 21,206 deaths in New York and 6,928 in Brooklyn. In the first nine months of the year 1867 the total number of deaths in New York was 17,834 and 6,374 in Brooklyn, and in the first three quarters of the year 1868 the mortality in New York amounted to 20,134 and in Brooklyn to 7,160.

The autumn or fourth quarter of 1867 was remarkably favorable to life and health in these two cities, and, with the exception of the presence of cholera in a few localities in both cities and an increasing mortality from scarlatina, the fourth quarter of 1866 was also a favorable season. The comparisons which were presented in a statistical way in the second report showed that

in the city of New York there was a total gain of 284 lives (fewer deaths) in the last quarter of 1867 over the corresponding three months of 1866; and further, that there had been 3,656 fewer deaths in the year 1867 than in 1866. Similar comparisons will appear in the conclusion of the present report. There has continued to be a steady increase in the chances of life; in other words, a decrease in the death-rates, excepting in the hot season. The very just remarks by the Deputy Registrar, Dr. Stiles, upon this point, as regards Brooklyn, will be read with interest in his report.

The rapid increase of population in New York and Brooklyn during the past three years has rendered it difficult to estimate the death-rates in these cities. Hence, in comparing the totals of mortality in these three years, allowance should be made for the vast annual increase of the population. From the best sources of information now available,* it is believed that the rate of increase of population in New York since the close of the war has been fully six per cent upon the total number year by year, and that in Brooklyn the rate of increase is believed to have been not less than nine per cent yearly. The non-resident or transient population adds a great number to the list of mortality during the year, though it is believed that in no other great city do strangers suffer less from acclimatising and endemic diseases than in New York. But in no other city is there such a prodigious flow of immigration from foreign countries; and of unsettled emigrants and other transient persons who died in this city during the past year, there were not less than , for we find that 703 died at the New York State Emigrant Hospital and Refuge, under the care of the Commissioners of Emigration, and that there were 883 deaths of persons who had resided less than one year in the city. The total number of emigrants who entered or passed through the city of New York in the year ending October 1st was 221,150, and the number of transient persons who tarry only a few days in the city during the year, amounts to a sum far exceeding the average proportions of this class of persons in any other great city with which we have opportunity to compare records of mortality. This class of transient persons contributes its share to the sum of mortality from apoplexy, diseases of the heart and other modes of sudden death, while not a few, also, are invalids and inmates of hospitals in the city temporarily for medical or surgical care. The statistics of this class of deaths should some day be presented to the Board; but our first duty relates to the permanent population.

* These sources of new information relate (1) to the total number of new dwelling-houses erected during each year since 1864 in each city; (2) the yearly increase of water-takers of the Croton and the Ridgewood, year by year; (3) the increased rate of crowding in dwellings, and the increased demand for house-room by the inhabitants; (4) the rates of increase in the number of school-children in each city and in the several wards, taken as a percentage basis for the estimation of the total population.

The details of arithmetical calculations upon these elements of the estimation of present population must, of course, be omitted in this place; but it is so sufficient that we state that they bring out quite harmoniously the numerical results above mentioned.

DISTRIBUTION OF POPULATION.

The city of New York is the centre of a vast population, which is constantly maintaining a movement of distribution or colonization in the four other Metropolitan counties. Its own resident population, nevertheless, seems to be increasing no less rapidly than it did before this great outflow began. The grand total of the inhabitants that are gathered about this Metropolitan centre of business and wealth is estimated, at present, to exceed 1,500,000 souls, within the limits of the Metropolitan District.

Of this population the city of Brooklyn claims nearly 400,000, and the city of New York, in the cold season, gives residence to nearly or quite 1,000,000. The rural towns contained at the time of the State census, in 1865, 178,352 inhabitants; the twenty-four towns of Westchester, 104,197; the three Metropolitan towns (out of six) in Queens county having 31,475; the five towns of Staten Island (Richmond county) having 28,209, and the five suburban towns of Kings county having 14,471.

New York City.—Manhattan Island comprises an area of nearly twenty-three square miles, or 15,000 acres; but of this area there are nearly three square miles inclosed as parks and public grounds, while nearly five more square miles are already devoted to the various uses of commerce and the trades; and, at the present rate of increase of the commercial requirements in New York, it is plain that less than half the total area of this island—that is, less than ten square miles—will remain long available for habitations and habitable streets. Hence the manner of distribution, the sanitary care and the vital statistics of the inhabitants of this city and of the entire Metropolitan District have become important in their relations to the social and physical welfare of the people.

Already the crowding of inhabitants has become so excessive in particular sections of New York that, to secure the voluntary distribution of population away from the denser masses has become a sanitary problem of great importance. And, although the majority of the over-crowded classes are tenants of uncomfortable homes, in which they have no concern except such as the monthly payment of rents may give them, these densest populations do not begin to show any tendency to disintegrate and seek a healthful distribution; yet such a distribution of inhabitants from the over-crowded sections need not be regarded as a formidable problem, for it can be brought about.

Present Distribution of Population in New York.—In former reports we have described the sanitary condition of the inhabitants in particular wards, their rate of crowding and their social condition. But the difficulty of keeping in mind the boundaries of wards renders it desirable to consider the present aspects of the city population, and the movements of it from a central look-out or stand-point, whence all sections of the city can be brought mentally into view. And this year it is particularly proper to do this, because in an attempt to study the sanitary history of the tenement houses of the city, with reference to practical questions in domiciliary

hygiene, we have, for convenience and economy of labor, regarded the city as divided into three great districts, two of which are south of Fourteenth street, and one north of that dividing line. The records of the special study here mentioned will be presented in a subsequent portion of this report, and will explain many things that would be tedious here.

From a stand-point taken at the intersection of East Tenth street and Fourth avenue, just east of Grace church, the observer may look out upon the city from the pivotal center of its population as given by the census of 1865; but with the extension of the population to the northward, since that census, the central point of the city's population is now believed to be at the intersection of Fourth avenue and East Fourteenth street, or the southern point of Union square.

To the southward from this point and west of Fourth avenue and the Bowery are seen the densely populated Fifteenth, Ninth, Fourteenth, Eighth and Fifth wards, in the order here mentioned, which, with the lodging houses and few remaining tenements in the Third, First and Second wards, extend to Whitehall and the Battery, and cover a total area of two square miles, and contained, at the last census, 181,549 inhabitants; and by extending the view over the entire area lying south and west of the Bowery and Catharine street, the observer views a district comprising nearly two and a half square miles, and containing a population that exceeded 187,280 at the last census; and turning southward from Fourteenth street and eastward from Fourth avenue and the Bowery the observer sees, comprised within the Seventeenth, Eleventh, Tenth, Thirteenth and Seventh wards, a district being only a little more than one and a half square miles in extent, yet containing a population somewhat exceeding 233,000 souls. Block after block, and street after street, in some of these wards have a tenement population, density ranging at the rate of from 250,000 to 300,000 souls per square mile, the street areas included. This will undoubtedly long continue to be the most densely peopled and perilously overcrowded district of the city. The portion of these two sections, devoted to dwellings, south of Fourteenth street comprise only about two square miles, and they contain a population scarcely less than half a million.

Turning northward from Union square the observer surveys the district that extends from Fourteenth street to Harlem river. It is a region containing all grades of population and presenting all kinds of local hygienic conditions, but both are capable of being brought up to the highest standard. It now contains nearly half a million of inhabitants. A margin near each river side, embracing from two to four blocks in width and extending two miles northward, being occupied mainly by a crowded tenement population, and suffering also from defective drainage and many local nuisances, gives a higher death-rate than should be suffered by even the poorest and most crowded populations. These river margins of this newer section of the city are more than twice as densely populated as the elevated interior section, and this difference will doubtless increase until the demands

of commerce above Fourteenth street displace the crowded tenements and their inhabitants.

The region extending northward from that which is now compactly built up is being so rapidly populated that scarcely ten years will elapse ere it will acquire all the characteristics of the district last described. The malarial character of a great part of this extreme northern section of the city will require great skill in its drainage and sewerage and all the problems of sanitary engineering; and, as this class of works is quite certain to be brought to such perfection in the region lying between Fourteenth street and the Harlem "flats," as will render it the most salubrious of any large portion of the city, it will doubtless be very compactly populated. When perfectly prepared for such a population by all the requisite sanitary conditions for domestic health, the death-rate in all that region need not exceed 15 in 1,000 yearly, though half of the population may be of the poorer classes. The death-rate now averages only about 16 in 1,000 yearly throughout the entire district of Murray Hill.

The outflowing of inhabitants from the city is already adding to the population of the four other metropolitan counties fully as many each year as are now added to the city and county of New York, hence the questions and the regulations concerning vital statistics and the interests of life and health in the city have come to be scarcely less important in the suburban portions of the Metropolitan District than in these cities.

Distribution of Population in Brooklyn.—The seventeen square miles comprised within the present limits of Brooklyn constitute the nucleus of a rapidly growing city that will ere long comprise more than fifty square miles. Kings county, inclusive of Brooklyn, contains seventy square miles. And adjacent, on the east, are the towns of Jamaica, Flushing and Newtown, in the county of Queens, which, like the rural portion of Kings county, are receiving the overflowing of city population.

Taking a central stand-point on the southern margin of Brooklyn, in Prospect Park, near the Reservoir, and at an elevation of 170 feet above tide-level, the sanitary observer looks out to the eastward and westward along a ridge more than seven miles in length, of which that park is the centre, and towards the crest of which and the sea-sides of Long Island the compact population of the city is steadily approaching, and beyond which crest, and onward towards Jamaica and Flushing, that progress is tending. Like Philadelphia, the city of Brooklyn has illimitable facility to extend inland, suffering but little pressure from the forces that condense our population upon the insular streets of New York.

Looking northward from the Mount Prospect stand-point across to "Brooklyn Heights" and over to the city of New York, the observer may survey the entire area of Brooklyn; and, in looking down upon the southern and southeastern or inland verge of the advancing line of dense population, he sees that the valley of Gowanus creek and the low lands extending thence to the Wallabout and Newtown creek—along a line extending more

than three miles from Gowanus bay—is compactly and for the most part newly populated, regardless of its traditional and well-earned reputation for malaria. In that valley or low land are situated the northern portion of the Eighth, the whole of the Tenth, Fifteenth, Sixteenth and a portion of the intervening wards. Then by the river side, near the Heights, are the Fifth, Sixth and Twelfth wards, below the Navy Yard, and above the Wallabout, the Thirteenth, Fourteenth and Seventeenth the other lowland wards are in view.

The highland portion of Brooklyn comprises more than half of the seventeen square miles of the city area, but in the consecutive improvement of streets and the progress of sewerage and construction, more than half of the compact portion of the population now occupies the lowland districts of the city. The careful analysis which Dr. Stiles, the chief officer of the Brooklyn branch of this Bureau, has made respecting the death-rates and the causes of mortality in these several wards, shows that locality as well as domestic and social conditions must have had much to do with the excess of mortality that is suffered in such wards as the Fifth, Tenth, Twelfth and Sixteenth, especially during the last five months in each year. His records show, for example, that in the Tenth ward the death-rate during the first six months of the year 1868 was only 22.46 in 1,000, while in the last six months of the year 1867 the rate was equal to 27.41 in 1,000 per annum. And this difference is still more striking in wards that are not yet sewered, but which are both elevated and open, namely the Eighth and Eighteenth wards, which lie at the extreme eastern and western points of the city. The rate in the first six months of the year 1868 was only 24.40 in 1,000, and in the last six months of the previous year it was 40.05 in 1,000 per annum, while by contrast we had in the First, Third and Fourth wards, counted together, a death-rate of 20.96 in 1,000 the first half of the year and of 21.18 in 1,000 (per annum) in the last half of 1867. These differences in the chances of life in the different wards are disappearing by the agency of local sanitary improvements, which are mentioned by Dr. Stiles in his report upon the mortality for the year.

Sanitary drainage and sewerage, and the ready avoidance of excessive condensation or crowding of population, are sure to render Brooklyn one of the most salubrious cities in the world. And this remark will apply to the greater portion of the three rural counties within the Metropolitan District.

Distribution and Vital Statistics of Population in the Rural Towns of the District.—Only partial and altogether voluntary returns of the births, deaths, and marriages in the rural towns are forwarded to this Bureau. But a knowledge of the methods and purposes of such registration have become universally extended throughout the four Metropolitan counties that lie beyond the two cities, and there is no reason now to prevent the Board of Health from ordering that complete and prompt returns shall be made from every town in the District.

In referring to this rural population, on a previous page, it was seen that in 1865 it amounted to 178,352, and is distributed in 37 towns. Most

of this population has, by steam carriage, been brought within from half an hour's to one hour's transportation into the heart of the metropolis. The city is constantly colonizing its best population in rural homes, and a vast number of city families are residents in the rural towns for nearly half the year. Hence it has become very important for the Board of Health to require the same accuracy and completeness of vital statistics in the rural towns as in the cities of the District. The death-rates and the questions of local healthfulness of some of the Metropolitan villages, already are regarded as scarcely less important to the nominal inhabitants of the two cities, than to the permanent residents in the villages themselves. The vital statistics of these villages and towns would now be particularly useful to the Board of Health and the public. Already the returns and other information concerning the rates and preventable causes of mortality in certain of these villages, show that infant life, at least, is far more secure in them than in the city during the warm season, while in other villages there is reason to believe that pulmonary consumption destroys even a greater percentage of the inhabitants than in the cities. Our inquiries on this subject are not yet sufficiently complete to warrant the publication of statistics, but as we stated and fully explained in our last year's annual report, there is no longer any doubt that local conditions play a subtle and very important part in the production of this most destructive malady. Some of the results obtained by Dr. Stiles, from a careful analysis of records and maps in the Brooklyn branch of this Bureau are tabulated and described in a note which he has prepared showing the excess of phthisis in particular localities. This note is found in the contribution of that officer, in a subsequent section of this report. Tabulated records of mortality by phthisis in the several wards of New York, are also given in a subsequent page of our report. And the observations and records we have already made concerning this destroyer in several of the suburban towns warrant the opinion that damp and undrained localities in the Metropolitan District, are quite as productive of fatal tuberculosis as are the bleakest mountain sides.

Upon this and a great variety of other practical questions in hygiene the people of our two great cities, and, indeed, the entire population of the State, need all the information that can be acquired by this Bureau of the Metropolitan Board of Health.* But this is only one of the many ways in which the recording and study of the vital statistics of all the towns in the Metropolitan District has become a matter of great importance to society. The fifty-three square miles of populated territory in the rural towns of Kings county, the more than 100 square miles in the three Metropolitan towns of Queens, the 400 square miles in Westchester county, and

* The Registrar begs leave to avoid repetition of the general argument upon this subject, by simply referring in this place, to the testimony he adduced in regard to it, from the studies of Dr. Henry I. Bowditch, of Boston, and John Simon, Esq., of the English Privy Council's Health Department. See Second Annual Report from this Bureau, pp. 154-157, New York edition, and pp. 281-286, Albany (2d) edition.

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square miles upon Staten Island, will give residence of the future population. And the time has already come when every natural and artificial condition that affects life and health in the different suburban regions, directly concern the people, and affect most vital interests in public economy and social progress. Therefore, that in this year's report from the Bureau of Vital Statistics, the records and deductions must be limited to the population of the city alone. But in presenting these statistics of New York and the year 1868, it is gratifying to have the assurance that it is of accuracy which has not before been attained by us, and which, as has rarely been equalled in any city that depends exclusively upon voluntary returns of voucher-certificates of the deaths, marriages: and although the returns for the latter events—way-farers' journey—are numerically incomplete, the records themselves are of a much desired degree of perfectness; while, as respects the mortality, and the various causes and circumstances of death, the completeness as now renders this branch of the vital statistics worthy and practically useful as a basis of hygienic study and

in the previous annual reports from the Bureau of Vital Statistics present a statement upon the sanitary experience and vital registration of the four quarters of the year. And following this section will be found the several chapters that are required for a useful presentation of Vital Statistics in a public health report.

SUMMARY OF THE QUARTERLY STATISTICS.

Public Health during the Winter Quarter, ending April 4th, was one of the coldest and most protracted winters that has occurred in this latitude of the Atlantic coast since 1836. The temperature in January was 25° and the lowest point, by the self-registering thermometer, was 3° Fahrenheit. The mean in February was 20° ; the coldest point reached was 5° below zero. March began and was an excessively cold month, the coldest point being at zero, on two days, the mean being 38° . The mean temperature in this quarter of the year, was $27\frac{1}{2}^{\circ}$ Fahr. The mean temperature in the winter quarter of the year, was $30\frac{1}{2}^{\circ}$; and comparing with the average temperature of corresponding months in twenty-five years, this weather record for 1868, shows that the mean temperature was colder than that

The winter was not unhealthful, except in regard to a certain increase in the congestive and inflammatory diseases of the respiratory system. The wide-spread prevalence of scarlatina and measles, the long cold days found a vast number of the poorer classes in an ill and unfit condition to endure the changeable weather of the season, and at the same time great numbers of children died of the

pneumonias and dropsies that followed as sequelæ of the exanthematous contagions that had been so prevalent in the winter. The first and the fourth weeks in March were the weeks of greatest mortality in this quarter of the year; 482 and 480 respectively, being the number of deaths in those weeks in New York, and 161 and 153 respectively, in Brooklyn. But in the week ending April 13th, there were 509 deaths in this city. In Brooklyn the experience was the same, except that there was a greater fluctuation in the fatality of scarlatina in that city towards the end of the quarter. The period of greatest cold was not the period of greatest mortality. Indeed the steady cold weather that prevailed throughout the first ten weeks of this year, was not of itself unfavorable to human life, though wherever penury and cold conjoined their adverse agencies, the chances of life were diminished.

DEATHS FROM ZYMOTIC DISEASES.

NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHOICAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the winter quarter, 13 4-7 weeks, ending Saturday, April 4, 1868.

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Registered during the winter quarter, 13 4-7 weeks, ending Saturday, April 4, 1868.

WARDS.

	Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Cholera Morbus & other Diarrhoeal Diseases.	Other Zymotic Diseases.	Total Deaths from Zymotic Diseases.	Deaths by Accident or Negligence. (Coroners' Inquest.)	Total Deaths from all Causes.	Total Population (in Wards), Census of 1865.	Percentage of Zymotic Deaths on Total Mortality.	Death-rate per 1,000 Annually of the Population from Zymotic Causes.	Death-rate per 1,000 Annually from all Causes.	
First.....	4	5	.....	.....	.....	1	.....	.....	.....	1	.....	1	12	5	87	9,852	13.79	4.87	35.32 a
Second.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2	13	1,194	7.69	3.35	43.55
Third.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	19	3,867	21.05	4.75	22.57
Fourth.....	1	8	2	2	2	3	2	1	.....	.....	.....	2	6	5	149	17,852	17.45	5.99	34.85
Fifth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	22	154	18,205	14.28	4.83	33.84 b
Sixth.....	1	6	37	5	181	19,754	14.91	5.47	36.70
Seventh.....	1	10	4	4	5	2	.....	.....	.....	.....	.....	2	7	5	230	36,082	17.39	4.03	23.18
Eighth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	6	30	220	30,088	13.63	3.99	29.24
Ninth.....	1	7	9	3	8	.....	.....	.....	.....	.....	.....	1	8	45	7	38,504	16.66	4.67	29.05 c
Tenth.....	3	33	6	1	8	.....	.....	.....	.....	.....	.....	1	6	3	203	31,537	23.67	7.86	33.63 d
Eleventh.....	3	19	9	10	4	4	4	4	.....	.....	.....	8	13	73	574	68,063	17.46	4.95	28.36 e
Twelfth.....	1	19	16	2	3	.....	.....	.....	.....	.....	.....	.....	1	8	145	28,259	45.64	37.09	81.25 f
Thirteenth.....	1	4	33	3	20,388	22.75	5.00	21.98
Fourteenth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	9	161	23,382	11.80	3.25	27.54
Fifteenth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	24	136	25,572	17.65	3.75	21.27
Sixteenth.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	8	210	41,972	15.24	3.05	20.01
Seventeenth.....	2	9	5	5	5	.....	.....	.....	.....	.....	.....	8	10	117	509	79,563	19.53	5.88	30.11
Eighteenth.....	12	38	16	16	5	.....	.....	.....	.....	.....	.....	1	8	49	287	47,613	17.07	4.12	24.11
Nineteenth.....	5	17	4	9	2	.....	.....	.....	.....	.....	.....	3	6	.....	653	39,945	21.59	14.12	63.39 g
Twentieth.....	1	5	13	4	5	4	4	7	.....	.....	.....	30	68	141	419	61,884	19.80	5.36	27.08 h
Twenty-first.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	16	80	83	38,669	17.13	8.28	48.31 i
Twenty-second.....	6	19	6	11	2	.....	.....	.....	.....	.....	.....	5	10	61	10	298	20.40	5.15	25.17
Totals.....	2	86	318	92	115	35	46	74	.....	6	144	323	1,243	173	5,953	726,886	20.88	6.84	32.78

a Castle Garden, 1. b New York Hospital, 47. c St. Vincent's Hospital, 23; St. Luke's Home, 1. d St. Francis Hospital, 29. e St. Joseph's Orphan Asylum, 1; House of Good Shepherd, 2; New York Juvenile Asylum, 2; Lenox and Watt's Hospital, 1; Bloomingdale Lunatic Asylum, 3; House of Refuge, 1; Ward's Island, 203. f Infants' Hospital, Ward's Island, 158. g City Lunatic Asylum, 39; Alma House, 85; Work House, 2; Small Pox Hospital, 2; Charity Hospital, 104; Epileptic and Paralytic Hospital, 4; Fever Hospital, 6; Colored Home, 33; Nursery and Child's Hospital, 44; St. Luke's Hospital, 1; Woman's Hospital, 1. g Mount Sinai Hospital, St. A Bellevue Hospital, 170; Home for the Friendless, 3.

^a Castle Garden, 1. ^b New York Hospital, 47. ^c St. Vincent's Hospital, 23; St. Luke's Hospital, 1. ^d St. Francis Hospital, 29. ^e St. Joseph's Orphan Asylum, 1; House of Good Shepherd, 2; New York Juvenile Asylum, 2; Leuke and Watt's Hospital, 1; Bloomingdale Lunatic Asylum, 3; House of Refuge, 1; Ward's Island, 203; Infants' Hospital, Ward's Island, 158. ^f City Lunatic Asylum, 39; Alma House, 85; Work House, 2; Small Pox Hospital, 2; Charity Hospital, 104; Epileptic and Paralytic Hospital, 4; Fever Hospital, 6; Colored Home, 33; Nursery and Child's Hospital, 44; St. Luke's Hospital, 32; Woman's Hospital, 1. ^g Mount Sinai Hospital, 8. ^h Bellevue Hospital, 170; Home for the Friendless, 3.

The crowding of the poorer classes, and, indeed of all classes except the wealthiest, in New York, was never before equalled. The number of families so greatly exceeded the number of tenements, that large numbers of the poor dwelt in groups of two or more families in single apartments. For example, in Greenwich street we found four families living in this manner, and in another street we found three families thus mutually sharing both the rent and the wretchedness of that class of unhealthful homes. The following brief notes which we extract from the reports upon the public health, that were transmitted by this Bureau to the Board, during the winter, show what were the chief sanitary questions at that period. Writing up the sanitary records for the last week in February, we submitted this statement :

"In the last week of February, there were 437 deaths in New York, including eighty-eight in the public institutions. There were 134 deaths in Brooklyn, and eleven in Kings county institutions, and streets beyond city limits. Scarlatina continues to be the predominant zymotic disease in the death list. It killed twenty-nine in New York, and sixteen in Brooklyn. Phthisis pulmonalis is charged with seventy-nine deaths in the former city and thirty-one in the latter. The various other organic, inflammatory and congestive diseases—the class termed *local maladies*—caused 43.25 per cent of all the deaths in the former, and 31.34 per cent of all in the latter city.

"The deaths of infants under one year of age, in New York, amounted to 132, or 30.20 per cent of the total, and in Brooklyn to only 21.64 per cent of the whole list. Children under five years gave 45.31 per cent of the deaths in the former city, and 47.76 per cent in the latter. Inanition, pneumonia, and brain diseases, are charged with most of this waste of infant life.

"Excessive cold, foulness of air, and the defects of diet among the poor are now felt extensively in New York. The mean temperature last week was 20° Fahr. This is 19° colder than the corresponding week of last year, and 21° colder than the first week of February this year, in London. The causes which operate against life and health among the poor in their crowded tenements, in this inclement season, are numerous, and they are rapidly augmenting in force as the demands for labor decrease, and prices increase.

"During the past six weeks there has been noticed a constantly increasing number of deaths from chronic ailments, which chiefly affect under-fed and extremely poor people whom penury has driven into unhealthful tenements and stinted with unwholesome and scanty food. To separate these combined causes of depressed vitality and chronic wasting of life would be impossible, for they are inseparably conjoined, except so far as the generous hand of charity may just now interpose with timely offerings of food. Three feeding stations of the Commissioners of Charities last week gave out 7,440 hot meals, and the Society for Improving the Condition of the Poor found thousands of needy families that can no longer keep the wolf of

hunger from their doors. All this benevolent feeding of stark hunger helps to keep a certain number of feeble persons from the grave and to prevent utter pauperism.

"But still the seven thousand applicants at the soup room, the fourteen thousand families and fifty thousand persons that looked to the Association for Improving the Condition of the Poor, and the multitude who daily beg to exchange their labor for food, though driven by hunger to ask such charity, do actually in their confession of this extremity of their want, make known to us a vastly more important and more lamentable kind of destitution, a kind that can be relieved and prevented only by comprehensive methods for improving the housing and self-care of the poorer classes. The vital importance of adequate food supplies for these classes, however, is worthy of attention, and it is obvious. And as a masterly observer, Dr. John Simon, of London, has remarked, "it must be remembered that privation of food is very reluctantly borne, and that as a rule great poorness of diet will only come when great privations have preceded it." Long before insufficiency of diet is a hygienic concern, long before the physiologist would think of counting the grains of nitrogen and carbon which intervene between life and starvation, the household will have been utterly destitute of material comfort; clothing and fuel will have been even scantier than food; dwelling-space will have been stinted to the degree *in which overcrowding produces or increases disease*; of household utensils there will have been scarcely any; even cleanliness will have been found costly or difficult, and, if there still be self-respectful endeavors to maintain it, every such endeavor will represent additional pangs of hunger. The home, too, will be where shelter can be cheapest bought, in quarters where there is least fruit of sanitary supervision—least drainage, least scavenging, and least light and air.

"Such are the sanitary dangers to which poverty is almost certainly exposed, *when it is poverty enough to imply scantiness of food*. And while the sum of them is of terrible magnitude against life, the mere scantiness of food is of very serious moment. Whoever will visit the crowded tenements in which want is now compelling the sufferers to beg for aid, will find in those places a vast amount of pining disease, besides the other causes that crowd the verge of pauperism."

In submitting the record for the first week in March, it was remarked that, "In the first week of March, ending last Saturday, there were 482 deaths in New York, including seventy-nine in the public institutions. There were 161 deaths in Brooklyn, exclusive of twelve which were returned from county institutions and streets beyond the city limits. It was the week of greatest mortality since the third week in September, 1867. The *lethal* causes of this excess were ample and obvious.

"The names given to the fatal diseases may not fully reveal these causes, but taken in connection with the local and individual circumstances of the deaths, the fact is plainly seen that timely charity prevented the list from exceeding 500.

"The number of deaths from chronic and constitutional diseases exceeded twenty-five per cent of the entire list! Phthisis terminated seventy-five lives in New York, and twenty-three in Brooklyn, while the inflammatory, congestive and organic diseases, that are classed as local maladies, are charged with forty-three per cent of the mortality in New York, and with thirty-nine and three-quarters per cent in Brooklyn."

The prices of breadstuffs and every kind of food-supply in the cities were so excessively high, and the rents of tenements were so greatly enhanced, that the poorer and improvident classes suffered in an unusual degree the want of means for healthful subsistence, so that in the month of March it became necessary for the Commissioners of Public Charities and Correction, to expend considerable sums, on public account, in food-supplies and fuel for the most needy. Fortunately, all kinds of winter industry as well as the wages of labor were well maintained. Yet the philanthropic persons who visited the poor remarked that at the opening of spring there was an unusual exhibition of the pallor and feebleness that comes of protracted subsistence upon a sloppy diet of "bread and tea," which is the wretchedly defective aliment of great masses of the poorer classes, when penury pinched severely. There is reason to believe that this pressure of want added very much, in various ways, to the total sum of mortality in the latter part of winter and the beginning of spring. But in all the more densely populated quarters of New York and Brooklyn, there was continually at work that most dreaded of all the foes of child-life, scarlatina. This subtle and yet unconquered infection, during the winter quarter, killed 318 children in New York, and 230 in Brooklyn.

The total mortality in this winter quarter exceeded that of the preceding quarter by only 328 in New York, but was diminished by forty-six in Brooklyn. In general terms, it would be proper to say that this excess was mainly due to the greatly increased prevalence of scarlatina, which seemed to culminate in its epidemic course at the end of this winter quarter, for there were more than twice as many deaths by this disease in the winter as in the autumn months; but there was an increase in some other classes of disorders also, while there was, of course, a decrease in the fatality of others, as will be seen in abstracts of some of these special records in a subsequent section relating to the varying causes of mortality in winter and summer.

State of the Public Health during the Spring Quarter ending July 4th, 1868.—The excessive cold of winter was projected far into the spring months. April had a mean temperature of only 43° Fahrenheit, and the mean of its second week was at freezing point. It was not until the second week in May that the mean temperature rose above 50°, and the mean for that month was scarcely 55°. The death-rate, which in March went upwards from the average of the winter months, reached its spring maximum in the third week of April, when 509 deaths were certified in New York, and 124 in Brooklyn. This followed an unusually cold and stormy

week that will long be remembered as one of the most inclement weeks ever experienced in New York in April.

Scarlatina began gradually to decline in fatality, as well as in the number of new cases daily reported, early in this quarter. It caused 130 deaths in New York in the four weeks ending April 25th; 112 deaths in the four weeks ending May 23d, and ninety-one in the next four weeks. No other disease exhibited any epidemic tendency, and at the beginning of June the death-rate began to go down, though the weather was scarcely summer-like. Excessive rainfalls, amounting to no less than inches depth of water during the month of May, had quickly and quite effectually executed a much needed work of general cleansing and sewer scavenging. In the first week of June, with the mean temperature at 65° Fahrenheit, and moderate degree of atmospheric humidity, viz, 67-100 of total saturation of the air, the number of deaths in New York decreased sixty-eight in a single week.

DEATHS FROM ZYMOTIC DISEASES.

NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHOEAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered in the spring quarter (13 weeks) ending Saturday, July 4, 1868.

WARDS.

	Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Cholera Morbus & other Diarrhoeal Diseases.	Other Zymotic Diseases.	Total Deaths from Zymotic Diseases.	Deaths by Accident or Negligence. (Coroners' Inquests.)	Total Deaths from all Causes.	Total Population (in Wards), Census of 1865.	Percentage of Zymotic Deaths on Total Mortality.	Deaths per 1,000 Annually of the Population from Zymotic Causes.	Deaths per 1,000 Annually of the Population from all Causes.
First	2	8	2	2	2	2	1	1	...	2	...	8	32	17	140	9,852	22.85	12.99	56.84 ^a
Second	1	1	8	18	1,194	5.55	3.35	60.30
Third	6	14	3,367	7.14	1.16	16.63
Fourth	10	154	17,352	16.88	5.99	35.50
Fifth	22	18	142	15.40	4.83	31.20 ^b
Sixth	4	149	19,754	13.12	5.47	30.17 ^c
Seventh	8	219	36,962	21.00	4.98	23.70
Eighth	31	191	30,088	16.23	4.11	25.38
Ninth	7	239	38,504	19.66	4.88	24.83 ^d
Tenth	12	205	31,137	21.95	5.71	26.00 ^e
Eleventh	14	352	58,983	22.44	5.30	23.88 ^f
Twelfth	11	639	28,259	57.74	52.21	90.44 ^g
Thirteenth	5	161	26,388	21.85	5.00	22.88
Fourteenth	10	169	33,382	13.34	3.30	28.01
Fifteenth	13	90	25,572	13.13	2.03	15.48 ^h
Sixteenth	2	180	41,972	19.44	3.83	17.20
Seventeenth	11	519	79,563	21.00	5.48	26.92
Eighteenth	13	265	47,613	17.36	3.86	22.36
Nineteenth	14	541	39,845	18.67	10.11	64.17 ⁱ
Twentieth	15	374	61,884	29.41	7.11	24.17 ^j
Twenty-first	40	452	38,660	19.91	9.91	46.75 ^k
Twenty-second	11	311	47,361	21.54	5.66	26.26 ^l
Totals	10	53	331	86	69	35	40	58	...	54	217	398	1,361	265	5,326	726,386	24.64	7.49	30.41

^a Castle Garden, 8; Fort Columbus, 2. ^b New York Hospital, 44. ^c City Prison, 3. ^d St. Vincent's Hospital, 22; St. Luke's Home, 1. ^e Ludlow Street Jail, 1. ^f St. Francis Hospital, 20. ^g Ward's Island, 167; Randall's Island, 18; Bloomingdale Lunatic Asylum, 5; Infants' Hospital, Ward's Island, 292; Colored Orphan Asylum, 3; House of Refuge, 2. ^h A Children's Aid Society, 3. ⁱ Work House, 3; Fever Hospital, 1; Woman's Hospital, 2; Roman Catholic Orphan Asylum, 2; City Lunatic Asylum, 34; Almshouse, 10; Penitentiary, 4; Small Pox Hospital, 8; Charity Hospital, 137; Colored Home Hospital, 20; Nursery and Child's Hospital, 45; St. Luke's Hospital, 20. ^j Mount Sinai Hospital, 9; Institution for the Blind, 1. ^k Bellevue Hospital, 218; Home of the Friendless, 17. ^l New York Orphan Asylum, 2; House of Mercy, 1.

The total number of deaths in this quarter was 5,523 in New York and 1,731 in Brooklyn. This increase over the mortality in the corresponding period in the previous year amounted to 402 in New York and 59 in Brooklyn, and like the increase of deaths in the winter quarter, when closely analyzed in regard to causes and localities of the excess, plainly indicated the fact that with the exception of the excess caused by the unusual fatality of scarlatina that increase in the total mortality was incident to a corresponding increase in the population of the city. This conclusion would be reached by studying the gradual and decided increase in the organic and inevitable source of mortality in the absence of any known or suspected cause for such general increase, except that the number of inhabitants was correspondingly increased. But there are many other circumstances that have entered into the analyses of causes, and which all tend to the same conclusions.

The death-rate continued to go down as the warmth of spring increased, until its minimum in the scale of mortality was reached in the first week of June, when there was a mean temperature of 65 degrees Fahrenheit and a genial range of warmth from 58 to 72 degrees. In that week there were only 348 deaths in New York and 96 in Brooklyn, which would be equal to a yearly death-rate of about 22 in 1,000 inhabitants in the former and 17 in 1,000 in the latter city. Prodigious rainfalls, amounting to no less than seven and a half inches depth of water during the past week, had fallen upon the two cities and swept the streets and sewers, leaving the cities and the atmosphere in a condition of unusual purity. Though this week's mortality was not so low as has been reached in the subsequent autumn, as will be seen in the records of November, this year, it was the lowest rate reached in the spring quarter. The rapid though very temporary decline in the total mortality in a vast city population, immediately succeeding the cleansing and invigorating agencies of great rainstorms, is worthy of special remark and hygienic study, and, regarding this point, it is proper to repeat here the paragraph that accompanied the weekly report of this Bureau at that time.

"As regards the period of least pressure of the Great Reaper's work, or that when life enjoys its best chances in this city, there seems every year to be a kind of 'Passover week,' which occurs some time in June in New York. In this benignant but very brief period of early summer human life enjoys a degree of security that is worthy alike of thankfulness and of a practical inquiry for the causes of it. Some of these causes are too obvious and important to be forgotten by the sanitary officers."

The total mortality in New York in the four weeks ending June 20th was 1,535, and 486 in Brooklyn. This against 1,732 and 536 in the respective cities in the previous weeks, and against 1,879 and 593 in these cities respectively in the four weeks that ended on April 25th. It was not until the mean temperature had kept above seventy degrees for three successive weeks that the death-rate began its fatal strides upwards. In the week that ended on July 4th there were only 413 deaths in New York and

122 in Brooklyn. The mean temperature was at eighty degrees, and the highest point eighty-seven degrees. We then reported that "the zymotic diseases have not increased except in regard to those that affect the bowels." The "summer complaint," or cholera, of infants is springing into fatal activity wherever filth is found or domestic care neglected. This destroyer of the nurslings is the most faithful of sanitary monitors, for where these little ones perish there exists some cause of damage to the health of the surrounding population. There were only three deaths in the Fifteenth ward of New York, and but one in the Third and one in the Eighteenth wards of Brooklyn in the week, or one in 8,000 inhabitants in these very cleanly sections, while in the slums of the Sixteenth ward, in the latter city, and in the Twentieth and Twenty-second wards in New York, there was one death in every 1,200 inhabitants. And there died 248 persons in the tenement houses in New York, while only eighty-seven deaths occurred in private houses and all other dwellings. In other words, the mortality was three times greater in the tenant houses than in private houses and all others." [A little more than one-half the entire population of the city being domiciled in tenement houses, as defined in the Health Laws.]

State of the Public Health during the Summer Quarter, ending October 3d, 1868.—These thirteen weeks in the past year will be remembered by the medical practitioners of New York and Brooklyn as having been remarkable for the prevalence of fatal diarrhoeal disorders, and an excessive rate of mortality among children. Yet it is the testimony of physicians generally that with the exception of choleraic malady of infants and a brief period of unusual fatality from acute diarrhoeal disorders which occurred in persons of all ages, in the last of July and the first two weeks of August, there was an entire absence of all epidemic phenomena.

It will be noticed in the report of the Brooklyn branch of this Bureau that Dr. Stiles states that the choleraic disease of children assumed the characteristics of an epidemic. These characteristics were more decidedly marked in certain quarters of New York than in any portion of Brooklyn. The epidemic phenomena of diarrhoea both commenced and terminated earlier in the former than in the latter city.

Each season has its peculiar relations to human health and the chances for life. Temperature and climate, and the questions relating to sanitary topography, drainage and cleanliness, and the variable qualities of food-supplies, separately and together, have relations to our city death-rates, which need to be very thoroughly investigated. The most we may now do in regard to these questions is to observe and record the facts with scientific accuracy and by systematic methods, so that useful deductions shall be made from them.

Though what we term, in this report, the summer quarter, is extended into the first fortnight or more of the autumnal weather of the last of September, this period of three months constitutes the sickly season in New

York and Brooklyn. The delightful temperature and clear skies of September do not terminate the summer diseases until a period of steady cold is reached, especially in such a summer as the last has been. If the autumn in Italy and Greece is the most sickly season of the year, because of paludal malaria and miasmatic influences, so that, as Tertullian said, it is *Tentator Valetudinum*, or the Tryer of invalids or feeble persons, we may truly designate the summer quarter of the year in New York, *Tentator Infantum*, the Tryer of child-life. This fearful waste of young life will not cease to awaken the deepest anxieties of the practicing physicians and all officers of health, until all causes known to be preventable shall have been brought under control. We readily ascertain and record the few physical phenomena which are the constant attendants upon the summer mortality; these are inevitable circumstances to which human life either adapts itself or suffers disastrously. But that the fearful rise in the summer death-rate, and the excessive mortality of infants are as inevitable as the mere increase of temperature is not probable. Hence the attentive observation and study of local and personal conditions becomes very essential to a correct understanding of these excesses in mortality.

DEATHS FROM ZYMOTIC DISEASES.

NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHEAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the Summer Quarter (13 weeks) ending Saturday, October 3, 1888.

DEATHS FROM ZYMOTIC DISEASES.														
NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHOEAL MALADIES AND OTHER ZYMOTIC DISEASES.														
Registered during the Summer Quarter (13 weeks) ending Saturday, October 2, 1868.														
WARDS.	Total Deaths from all Causes.													
	Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-Cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Cholera Morbus & other Diarrhoeal Diseases.	Other Zymotic Diseases.	Total deaths from Zymotic Diseases.	Deaths by Accident or Negligence. (Coroners' Inquests.)
First.....	2	2	2	2	2	2	1	1	1	54	20	2	79	182
Second.....	2	2	2	2	2	2	1	1	1	7	2	2	12	12
Third.....	1	1	1	1	1	1	1	1	1	49	24	7	86	30
Fourth.....	1	1	1	1	1	1	1	1	1	34	20	6	73	225
Fifth.....	2	2	2	2	2	2	1	1	1	67	18	8	103	232
Sixth.....	4	4	4	4	4	4	4	4	4	105	51	11	181	241
Seventh.....	1	1	1	1	1	1	1	1	1	60	28	10	110	412
Eighth.....	1	1	1	1	1	1	1	1	1	56	48	10	125	334
Ninth.....	1	1	1	1	1	1	1	1	1	72	45	8	145	924
Tenth.....	1	2	5	4	3	6	3	4	4	150	110	18	311	908
Eleventh.....	5	5	3	2	2	19	32	2	77	330	118	590	5	305
Twelfth.....	2	7	1	3	6	1	3	3	68	43	5	139	8	257
Thirteenth.....	3	8	2	4	4	1	3	3	66	15	8	94	4	382
Fourteenth.....	1	1	1	2	3	2	2	2	22	8	6	44	3	121
Fifteenth.....	6	2	2	2	2	3	1	5	67	38	4	126	3	350
Sixteenth.....	12	9	7	7	7	7	1	5	207	141	14	410	5	837
Seventeenth.....	1	6	3	3	3	5	1	1	91	41	7	157	5	393
Eighteenth.....	1	1	7	2	1	5	4	18	108	125	33	306	18	722
Nineteenth.....	3	15	2	1	9	1	2	1	141	72	23	271	10	656
Twentieth.....	2	6	2	2	1	7	1	5	86	61	25	194	50	550
Twenty-first.....	2	9	7	3	8	26	1	5	148	102	7	312	12	666
Twenty-second.....	1	48	102	48	37	102	34	107	9	1,725	1,342	320	3,870	8,688
Total.....	1	48	102	48	37	102	34	107	9	1,725	1,342	320	3,870	8,688
Deaths by Accident or Negligence. (Coroners' Inquests.)														
Total Deaths from all Causes.														
Census of 1866.														
Percentage of Zymotic Deaths on Total Mortality.														
Death-rate per 1,000 Annually of the Population from Zymotic Causes.														
Death-rate per 1,000 Annually of the Population from all Causes.														

^a Castle Garden, 9; Fort Columbus, 2; Fort Wood, 1. ^b New York Hospital, 61. ^c City Prison, 6. ^d St. Vincent's Hospital, 28. ^e St. Francis' Hospital, 16. ^f Ward's Island, 242; Randall's Island, 7; Bloomingdale Lunatic Asylum, 9; Infants' Hospital, W. I., 33; Colored Orphan Asylum, 2; House of Refuge, 1; St. Joseph's Asylum, 1; N. Y. Juvenile Asylum, 1. ^g R. O. Orphan Asylum, 2. ^h City Lunatic Asylum, 38; Alma House, 28; Penitentiary, 9; Charity Hospital, 104; Epileptic and Paralytic Hospital, 3; Colored Home Hospital, 29; Nursery and Child's Hospital, 43; St. Luke's Hospital, 20. ⁱ Mt. Sinai Hospital, 16. ^k Bellevue Hospital, 221; N. Y. Orphan Asylum, 1.

Abstract of Deaths Registered in the City of New York in the Third Quarter of the Year 1898. Sexes, Nativities, Ages and Percentage at each Period.

MONTH.		Males.					Females.					Total.		United States.					Foreign.																														
Under 1 yr. of age.		1-2.		2-3.		3-4.		4-5.		5-10.		10-15.		15-20.		20-25.		25-30.		30-35.		35-40.		40-45.																									
MONTH.		M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.																								
Total.....		4,592		4,066								8,658		6,457						2,463		3,267		804																									
July.....		1,822		1,445										3,267						2,463		3,267		804																									
August.....		1,439		1,279										2,762						2,143		2,762		620																									
September.....		1,331		1,279										2,609						1,851		2,609		758																									
Total.....		4,592		4,066										8,658		6,457				2,463		3,267		804																									
Percent. of deaths in each period of life on total mortality of quarter.....		22.21		16.84		40.79		1.77		1.44		.90		.70		.51		.39		1.82		1.92		502.06		1.70		1.93		1.49																			
Total of both sexes.....		3,068		1,427		278		139		78		195		76		149		279		317		296		323		264																							
Percentage of both sexes on total mortality of quarter.....		42.37		16.48		3.21		1.00		.90		2.28		.87		1.73		3.22		3.66		3.42		3.85		3.05																							
45-50.		50-55.		55-60.		60-65.		65-70.		70-75.		75-80.		80-85.		85-90.		90-95.		95-100.		100 and upwards		Total																									
M.		F.		M.		F.		M.		F.		M.		F.		M.		F.		M.		F.		Total																									
July.....		55		31		40		26		25		13		29		34		23		27		16		18		17		8		3		6		1		1,822		1,445		3,267									
August.....		45		40		28		21		30		22		24		20		28		20		10		26		12		13		5		10		1		8		1		1,630		1,348		2,982					
September.....		54		29		37		34		28		18		29		25		30		26		15		25		11		23		8		12		5		1		2		1		1,331		1,278		2,609			
Total.....		154		100		105		81		84		53		81		69		81		73		41		69		40		44		16		38		6		19		3		7		1		4,592		4,066		8,658	
Percent. of deaths in each period of life on total mortality of quarter.....		1.78		1.51		2.1		.94		.97		.61		.94		.80		.64		.84		.47		.80		.46		.51		.18		.32		.07		.22		.04		.08		.01		.01		53.03		46.97	
Total of both sexes.....		254		196		187		150		134		110		84		44		25		10		1		1		1		1		1		1		1		1		1		1		1		8,658					
Percentage of both sexes on total mortality of quarter.....		2.93		3.15		1.55		1.74		1.78		1.27		.97		.50		.29		.12		.01		.01		.01		.01		.01		.01		.01		.01		.01		.01		.01		.01		.01			

During the thirteen weeks that ended on the 3d of October, there were 5,523 deaths in New York, and 3,402 in Brooklyn. These tabulated abstracts show how this mortality was distributed in the several wards and public institutions of the cities, and the columns for "cholera infantum" and "other diarrhœal diseases," respectively point out the share which the bowel disorders and the *causes* of those maladies had in the total record of mortality. But there is another lesson contained in the single fact that counting all the causes of infant mortality, we find that they destroyed in these thirteen weeks 3,668 nurselings, that had not reached their first birthday, in New York, and 1,598 in Brooklyn; while 1,427 in New York that were between one and two years of age, and 690 of like age in Brooklyn: 278 and 109 children in the respective cities between two and three years of age; 139 and 43 respectively, between three and four; and 78 and 28 between four and five: or, in these first five years of childhood 5,590 died in New York, and 2,468 in Brooklyn. This is an unusually large percentage of infant and child mortality even for the metropolitan population.

In order to arrive at just conclusions concerning various causes that operated to produce the excessive death-rate in this summer quarter of the year 1868, several points of inquiry need to be examined with reference to conditions that in an unusual degree affected the health of the city inhabitants unfavorably. *First.* The fact that no epidemic prevailed, and that even scarlatina and measles, which had prevailed extensively during the winter and spring, nearly disappeared from the mortality records during the summer quarter, compel us to look elsewhere than to epidemic infections for whatever causes produced excessive mortality. *Second.* The food supplies of the people were quite as good as they usually have been at this season of the year, with the single exception, that may justly be made, for a period of two or three weeks during which it is possible, and, indeed, quite probable, that diarrhœal disorders were increased by the occasional sale in market of certain meats and viscera from diseased cattle, no unusually pernicious supplies are known to have entered into the foods offered in the Metropolitan markets. *Third.* The rate of crowding of the population had increased in most of the tenement districts, but the increased cleanliness and care of the tenement property probably outweighed the aggregate evils of the increased crowding. *Fourth.* The increase of population, rapid as the influx of it has been, cannot account for the summer death-rate. *Fifth.* No unusual defects and evils in the sewerage nor in the water supply can be alleged. Very careful investigations regarding these points, made for more general purposes, show that water and sewers were in no way chargeable with the excessive fatality of diarrhœal maladies. Hence, passing over all the more insignificant conditions affecting the public health in summer, we find that the long continued hot and damp weather, and the injurious agencies which such weather called into activity, are the chief external causes of the increased death-rate in the summer of 1868.

The actual cause of a particular disease and of a fatal termination or a disease oftener is found to consist in an assemblage of morbid causes than of a single elementary cause, though there may be in certain maladies some one single and indispensable morbid factor, without whose presence and force the particular malady to which it pertains will not be produced. This is especially true of the ordinary diarrhoeal disorders. During the period of peril from this class of disorders last summer, it was permitted us by the Board of Health, to call attention to whatever *essential factors* of fatal maladies were at various times, and under changing circumstances, most important and avoidable, or most readily within the reach and control of sanitary authority and personal effort. It is important not to have this view of the duties of sanitary officers misinterpreted. The masses of the people can readily be induced to grasp and abate *particular causes* (factors) of destructive diseases when their families are menaced by them, but the complex truths which the medical officer of health has to study cannot be wisely or usefully rendered into the homely phraseology of every day life and be put into aphorismal sentences, and no attempt need ever be made to do so, for the homely and partial modes of advice are practically better. Probably there had not been a summer previously in the history of the metropolis when sanitary cleanliness was so needful, and when every source and cause of local contamination of the atmosphere worked more injuriously as a joint factor with all other causes of bowel disorders.

Without pursuing this statement further let the following facts be examined in relation to the external physical conditions that distinguished the past summer, in connection with the statistical statement of the records of mortality for the period. We will here compare the history of corresponding periods in the last three summers.

STATEMENT from the Special Records of Mortality in New York and Brooklyn in three successive Summers (showing certain essential Points of Comparison).

CAUSES AND CLASSES OF DEATH.	New York.			Brooklyn.		
	1866.	1867.	1868.	1866.	1867.	1868.
Total number of deaths	9,794	6,478	8,658	3,458	2,949	5,402
Total number of infants under one year.....	3,129	3,121	3,668	1,175	1,311	1,598
Total number of children under five years	4,851	4,893	5,580	1,895	2,071	2,468
Total deaths by zymotic causes ...	4,853	3,193	3,870	1,698	1,320	1,404
Total deaths by diarrhoeal diseases	3,933	2,329	3,076	1,570	992	1,004
Total deaths by cholera infantum.	1,490	1,356	1,725	717	726	1,004
Total deaths by malignant cholera:	1,080	25	9	517	4	
Total deaths by sunstroke and direct effects of heat.	299	4	190	33	.....	36
Total deaths by apoplexy and congestion of the brain.	263	165	214	43	18	36

CONDENSED STATEMENT concerning the Weather in the Three Successive Summers.

GENERAL STATEMENT FOR THE THREE MONTHS.				STATEMENT IN REGARD TO TEMPERATURE AND HUMIDITY EACH WEEK.									
YEAR.	Mean temperature for three mos.	Average humidity of atmosphere.	Total depth of rainfall.	FIRST.		SECOND.		THIRD.		FOURTH.		FIFTH.	
				M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.
1866	74	54	16.25	79.80	65.76	79.67	60.1	81.05	65.40	75.64	77.3	77.27	65.64
1867	70	65	15.54	77	65	72	61	68	61	75	64	75	70
1868	75	60	25.14	80	66	80	68	88	60	78	76	80	69

CONDENSED STATEMENT—Continued.

STATEMENT IN REGARD TO TEMPERATURE AND HUMIDITY EACH WEEK.																
YEAR.	SIXTH.		SEVENTH.		EIGHTH.		NINTH.		TENTH.		ELEVENTH.		TWELFTH.		THIRTEENTH.	
	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.	M. T.	AV. H.
1866	75.02	59.97	66.70	72.38	64.35	78.03	67.01	75.97	71.98	75.91	64.54	72.14	65.15	86.21	80.72	74.45
1867	75	78	76	71	75	71	70	62	72	67	64	50	70	66	59	54
1868	78	74	74	55	76	73	74	66	76	72	74	76	63	59	60	79

The following facts will be found especially worthy of notice in the foregoing abstract:

(1.) That as regards the total amount of mortality, and also as regards the excessive fatality of diarrhoeal maladies, the experience of the summer quarter in 1868, resembled that of the corresponding period in 1866. There were 1,080 deaths by Asiatic cholera, in New York, in that period of 1866, and, altogether, there were 1,106 more deaths in the summer quarter that year, than in the last summer.

(2.) The zymotic diseases altogether, in the summer of 1866, are charged with 980 more deaths than in the summer of 1868. And this close approximation to the rate of fatal zymotic diseases of the former season, is wholly in the common diarrhoeal disorders. Indeed, if the 1,080 deaths by cholera, in New York, and the 517 in Brooklyn that year, are omitted in the comparison, it is seen that there were 223 more deaths by diarrhoeas, in New York, and 550 more in Brooklyn last summer than in the corresponding period in 1868.

(3.) The fatal prevalence of cholera infantum in the summer of 1868, greatly exceeded that which occurred in 1866. In New York there were 285 more deaths, and in Brooklyn 367 more, by this cholera of infants, than occurred in 1866. And it should here be remarked that this difference does not result from any error or habit of physicians in regard to certifying the causes of death; for, in the entire visitation of Asiatic cholera in 1866, only fifty-three deaths of children under five years of age, were charged to that cause in New York, and only thirty-one in Brooklyn.

(4.) Sunstroke, and the direct "*effects of heat*," destroyed many lives in 1866 and 1868, but when the entire list of causes of death that might be attributed to heat, directly, is analysed, it is found the fatality of this cause was greatest in 1866.

(5.) A close analysis of the death records shows that the chief difference in the pressure from particular causes of mortality, so far as the names of causes are concerned—between the records of death in the summers of 1866 and 1868, consists in the increase of fatality in the diarrhoeal maladies of children last summer. Some of the numerical increase in mortality must fairly be attributed to increase of population, but not the whole of it.

(6.) The mean temperature in the summer of 1868 was 1° (Fahrenheit) hotter than in the summer of 1866 and 5° hotter than the mean in 1867. This slight difference, alone considered, cannot be charged with the increase in the fatality of the common diarrhoeal diseases. It requires no argument to show that if the increased temperature of the last summer produced any considerable proportion of the increase in mortality, it must have done it merely as a factor that operated conjointly with agencies which were rendered active by it, or that in an unusual degree co-operated with it.

(7.) The excessive humidity of the atmosphere and the unusual quantity of rainfall are not to be overlooked in this analysis of causes of the summer

diseases. They certainly had a share in the production of *lethal* causes, or of the causes of fatal disorders in young children. That these ever-ready colleagues of excessive summer heat, operating conjointly, should produce some evil consequence in densely crowded cities, especially in particular regions that have not yet come fully under the influence of sanitary improvement, was as inevitable as the laws of natural chemistry.

It need not be claimed here that the miasmatic element caused even the chief part of the injury that was done to health and life last summer. It was but *one factor* in the total sum of associated causes which were in operation. But let it be borne in mind that, except in particular localities, and in particular classes of persons, the summer was a healthful one, and that the family physician to the well-to-do and healthfully located classes of inhabitants in the Metropolitan District testify that it was a healthful summer.

The bare statement of the fact that 2,755 children under five years of age and 321 older persons perished by diarrhoeal maladies in the three summer months, and that in Brooklyn during the same period the same class of causes is charged with the death of 1,406 children and 128 older persons, cannot fail to awaken thoughtful inquiry into the causes of such fatality. And we separately present these records for this purpose.

Human life is too precious to be needlessly wasted and cut off, and it is a very important fact in hygiene that "where infants and children perish in great numbers, there will the general security of human health in older persons be endangered." Yet it is only within a few years that the rate of infant mortality, or even the general death-rate of particular localities and of entire communities has been studied and recorded for the aid it gives in the discovery and cure of the preventable sources of disease. And both in New York and Brooklyn the infant death-rate and also the total diarrhoeal mortality at all ages have to be carefully observed with regard to the mixed causes that usually are conjoined in the production of excessive rates of mortality. The sanitary officer has to study these conjoined causes, and he often finds it difficult to say whether the foulness of the atmosphere and surroundings of crowded dwellings, the close proximity of offensive nuisances, or the faultiness of diet and personal habits, is really the chief of all the evils. Careful observation warrants the remark that the Board of Health has wrought its most effectual results where it has successfully reached and removed or mitigated two or more of these groups of evils.

During the period of greatest mortality, last July and August, the Board adopted some unusual and important measures for promoting the general purity of the atmosphere, and of foul spots in the city, by the application of crude carbolic acid in streets, gutters, and wherever putrescent matters were found. This effort was attended by results which warranted the conclusion that those districts of the city which were so treated by antiseptic sprinkling were decidedly improved in regard to those unhygienic conditions that were associated with the excessive diarrhoeal mortality in children.

The following abstract of records of mortality in the wards that chiefly received this application of the disinfectant will show that there is reason to mention this subject with satisfaction, especially as it was in the five wards here given that the death-rate by diarrhoeal maladies was rising most rapidly. The local and surface sources of putrescence were most abundant in these wards, and there was every reason to fear that the fatality of diarrhoeal diseases would continue to increase until the onset of cold weather. The statistical statement herein given shows that this

WEEK ENDING.	FIRST WARD.			ELEVENTH WARD.			THIRTEENTH WARD.			TWENTIETH WARD.			TWENTY-SECOND WARD.		
	Chol. Infantum.	Total Diarrhoeal.	Total Mortality.	Chol. Infantum.	Total Diarrhoeal.	Total Mortality.	Chol. Infantum.	Total Diarrhoeal.	Total Mortality.	Chol. Infantum.	Total Diarrhoeal.	Total Mortality.	Chol. Infantum.	Total Diarrhoeal.	Total Mortality.
July 18th.....	10	10	28	30	44	89	11	13	38	26	35	94	36	48	111
24th.....	8	10	13	16	32	58	11	13	27	11	23	60	16	36	62
August 1st.....	5	6	11	25	38	69	8	14	28	11	16	52	12	21	52
8th.....	9	10	14	16	59	59	8	11	37	14	27	55	14	23	52
15th.....	3	4	11	8	16	42	5	9	16	16	19	44	13	20	51

special class of fatal disorders in these most sickly wards not only did not increase, but that it continued to decrease, and that it decreased even more rapidly than the general death-rate from all causes in the same wards or in the whole city. Omitting these five wards, and the two others that were partially treated by the same antiseptic sprinkling, the ratio of the diarrhoeal deaths did not decrease during the period here given.

The peculiar nuisances and local foulness that existed in various parts of the Twentieth and Twenty-second wards were not all accessible to such topical applications of disinfectants, but the fact was clear enough that this topical treatment of damp and unclean streets and gutters, and, ultimately, of the sewers also, by carbolic acid and sulphate of iron, did produce decidedly salutary effects. Much greater results would be reached if such specific means for arresting the putrefactive operations of natural chemistry could be intelligently applied in every household. In the crowded and once unhealthful city of Bristol there has been a successful effort to show the common people how to perform this sanitary duty, and, for the past two years, no similar city in England or America has had so low a death-rate. Such records of diminished death-rates may instruct us in the art of saving life.

In the most densely crowded tenement regions of New York there is no cessation to the mortality from bowel disorders, but it was observed in the hot season this year that the phenomena of rapid increase and obstinate fatality of diarrhoeal disorders were more marked in the outlying portions of the Twentieth and Twenty-second wards, and later in the season in

the Twenty-second ward, that is the intensely degraded and crowded Fourth and Sixth wards. The record of last week is compared in the opposite pages translated into the position it is held in the district and it is seen that the absolute mortality in those wards for the sixteen last weeks of summer and the first four weeks of the autumn.

It will be noticed that the quantity of this diarrhoea in the Twenty-second ward is something enormous, though the social and domestic condition of the people and the natural advantages of location is that ward is far superior to those of the Fourth and Sixth wards. In the former locality the broad avenue and open half drained and filling ground was exposed to the direct effect of high temperature and to all the other influences that affect the west side of that ward almost continuously from Thirty-sixth to Eighth street. Diarrhoeal mortality increased and gradually and came to its maximum much later in the hot period, and also decreased more slowly in the Fourth and Sixth wards than in the Twenty-second ward. We mention these facts for the purpose of calling attention to the removable causes which operated to produce the diarrhoeal disease in both localities and also the special cause of the difference in the intensity and in the date of that mortality in the two localities.

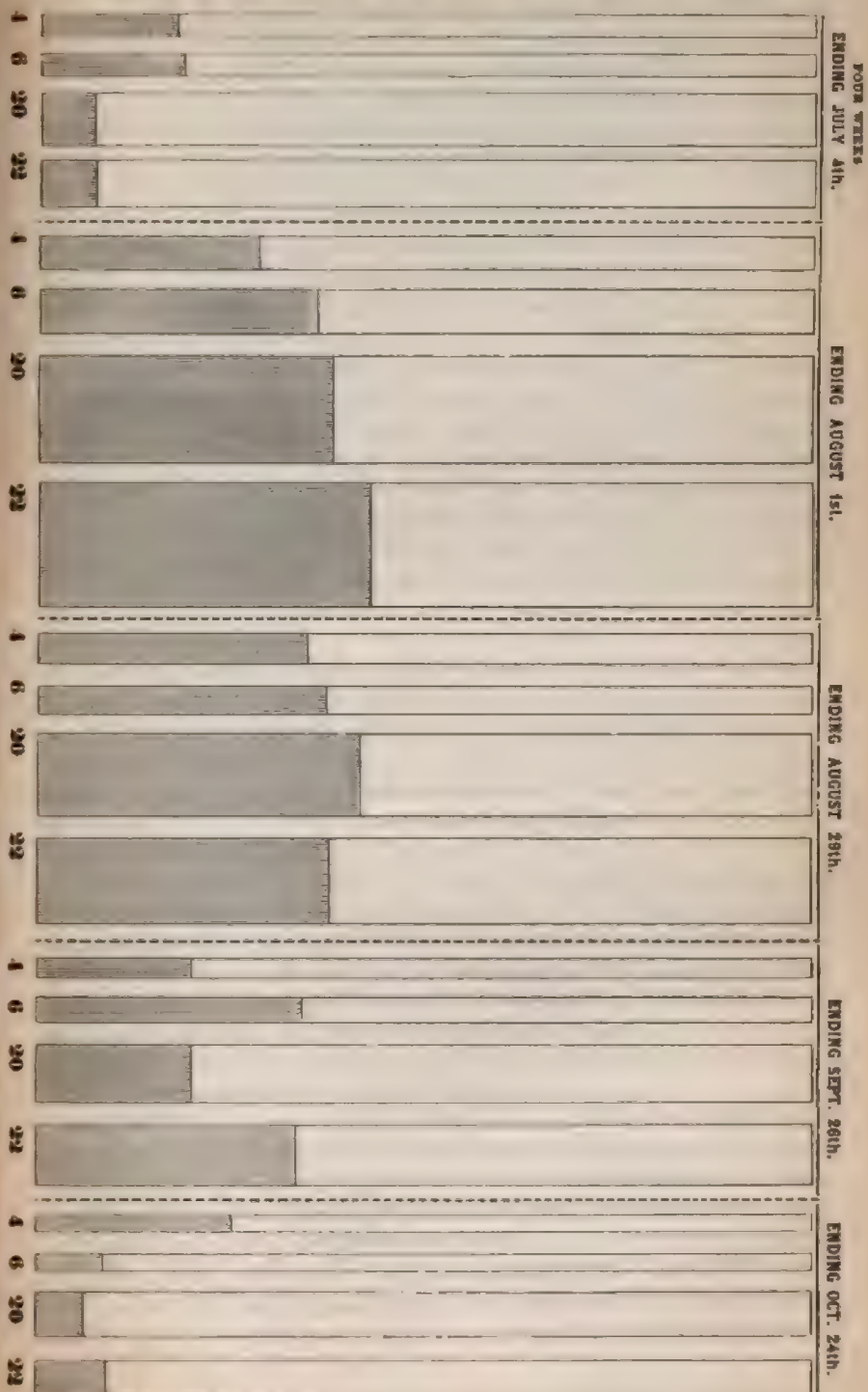
Observations which were made by the Registrar at the time of personal inspection of the local and other conditions concerned in producing the excessive mortality were submitted to the Board in connection with the weekly and charts of mortality week by week. A single passage from one of these weekly statements may be quoted here to express concisely the view then taken of the matter. Under date of July 14th it was stated:

Though both cities are free from epidemic disease, than at any former period in many years, the great destroyers of child-life among the poor are just now passing from street to street and with the ghastly finger of death they point out the districts where sanitary cleansing most needs to be enforced and where chronic nuisances are doing a monstrous work. These external and most ruinous causes it is true, are so associated with ignorance of domestic and personal hygiene among the ignorant and improvident classes, that it might be difficult to estimate the relative importance and force of the several causes, had it not come to pass that the regions worst afflicted now are not the old slums of the Fourth and Sixth wards, but rather the newer and less faithfully scavenged slums of the Twentieth and Twenty-second wards in New York. In the latter ward, however, in situation, elevated, and not yet half built up, extending from Fourth to Eighth-sixth streets, the Central Park and Sixth avenue to the North river, there were no less than sixty-five deaths last week, and a still higher rate the past three days, or about one funeral to every 770 inhabitants now living in the ward, while in the intensely degraded and most overcrowded population of the Fourth and Sixth wards there were less than one death to the 1,000 living. Foul and ignoble as are these latter wards, never in twenty years have they been seen in so cleanly a condition, and so free from nuisances as at the present time; but, as regards the filth of streets

COURSE OF MORTALITY

IN THE

4th, 6th, 20th and 22d Wards, during the Sickly Season, 1868.





and gutters, and the insufferable nuisances of the sickly quarter of the Twentieth and Twenty-second wards, these evils exceed description; after a careful inspection of them, I deliberately charge them with the slaughter of a large quota of the 123 deaths which occurred in these naturally beautiful wards, now outraged by the worst and most preventable of nuisances."

On the 4th of August the following statement was submitted regarding the events that had led to such exchanges of information between this Bureau and the Surgeon-General of the U. S. Army as induced that officer and the General in charge of the recruiting and transportation of troops, to order the immediate suspension of that branch of the army service in New York, on account of apprehensions that the infective quality of Asiatic cholera might prove to be present in the rapidly fatal diarrhoeas that were occurring the last two weeks in July:

"Panic and popular alarm are never created by doing whatever must be done for the public safety, and the present exigencies are peculiarly important, though we do not yet find any proof that the Asiatic infection has either caused or given destructive force to the diarrhoeal epidemic which now prevails in certain quarters of New York. Up to the present date we find that local and personal causes have produced nearly, if not quite, all the diarrhoeal deaths. Moreover no groups of two or more of the suddenly fatal cases of diarrhoea, with collapse, etc., have yet occurred in the same house, or the same block."

"During the past week there has been a remarkable decrease of mortality in those wards in New York which have received the most thorough cleansing and disinfection, but it is too soon to find the full results of such sanitary purification. And there is a special kind of instruction and sanitary authority needed in the crowded tenement districts, that shall show the ignorant and poor how to purify their unhealthful homes."

The total mortality in New York in the four weeks ending August 1st, was 3,207, and of these deaths 1,508 were infants under one year, 1,572 were charged to zymotic diseases and 185 to insolation or the immediate effects of excessive heat. The total number of deaths in the *eight* weeks that preceded, and which included two very hot weeks, was only 3,223, or less than half the death-rate of the last four weeks period."

On the 25th of August the following facts were mentioned in submitting the records of mortality for the preceding week:

"The temperature and humidity continue to be almost tropical; 76° F. was the mean and 67° and 90° the extreme of temperature, and .73 of total saturation was the average of atmospheric humidity last week. These conditions continue to make it necessary to exercise the greatest vigilance in enforcing the utmost cleanliness.

"The diarrhoeal disorders continue to predominate over all other preventable causes of mortality. They caused 291 deaths in New York and

159 in Brooklyn, last week, and they constituted more than fifty per centum of the mortality by the entire zymotic, or filth and infection, class of diseases.

"The fact that 39.75 per cent of all deaths in New York, and 51.12 per cent of the mortality in Brooklyn was caused by acute bowel disorders, demands attention to the preventable causes just mentioned. Cholera infantum is charged with 141 deaths in New York, and 113 in Brooklyn. In the former city there were 149 other fatal cases of diarrhoeal disease, but in Brooklyn only forty-six others. The surroundings and local characteristics of the districts in which these deaths occurred serve to point out the chief preventable causes." The weekly map of this kind of mortality shows precisely where the unhealthy classes dwell. The following note upon this map is suggestive: East Eighteenth street, from First avenue to avenue A, three deaths; seven squares bounded by East Forty-seventh street, East Fifty-third street, Lexington avenue and Third avenue, ten deaths; six squares bounded by Scammel, Corlears, Water and Madison streets, seven deaths; square bounded by West Sixteenth and West Seventeenth streets, Ninth and Tenth avenues, four deaths; while space bounded by Bleecker street, Central Park, Sixth avenue and Lexington avenue, only five deaths. The comparison of healthful with unhealthful sections in Brooklyn shows the same facts. In the filthy and damp Twelfth and Sixteenth wards, the people died last week at the rate of one (1) in every 500, while the cleanly and well-ordered First, Third and Fourth wards, the "heights" of Brooklyn, lost less than one in 2,000 of the inhabitants.

The death-rate began to fall off very decidedly, in New York, the first week in September. But the high temperature did not begin to fall until the second week. The vast quantity of rainfall during the first week in this month served as a sanitary purifier. The great storm that began during the evening of the third of the month, precipitated no less than 6.68 inches depth of water during that night and the succeeding day. That flood of water over the entire surface of the city, swept and washed the streets, gutters, court-yards, alleys and sewers more effectually than any other storm we recollect for many years. As we stated at the time, the storm was an hygienic benefit. The more than two billions of gallons of water that fell upon the island of New York in that cleansing storm, poured into the streets and sewers more than thirty times as much water as the Croton Aqueduct daily conveys to the city.

The Metropolitan District enjoys a natural means of sanitary purification by its great rain-storms, which is particularly fortunate, and the records of which must annually be mentioned in the returns by the Bureau of Vital Statistics. The average rate of rainfall in the two cities ranges from forty to sixty inches, and in particular portions of the District, espe-

cially along the Hudson river slope, from Peekskill to New York,* as well as upon the Long Island portion,† the annual precipitation often exceeds sixty inches depth of water. The necessity for sanitary drainage in consequence of such vast quantities of surface-water are doubly compensated, and the drainage and sewerage also will be rendered the more effectual by the sudden and immense rainfalls.

During the third week in September the nights became cool, and the self-registering thermometer marked 50° Fahrenheit for the first time since the last week in May. The mean temperature was 63°. From that date the zymotic causes of mortality rapidly decreased in activity, and the death-rate fell steadily. The chief points to which attention has been here directed in regard to the events of this *lethal* quarter of the year 1868 will be readily seen upon the diagram that introduces the records of the four seasons.

State of the Public Health During the Autumnal Quarter ending Dec. 31st, 1868.—The rapid decrease that was noticed in the death-rate in New York the last six weeks in the previous quarter of the year continued until a minimum was reached in the second week in November. The moderate temperature and wholesome dryness of the atmosphere were no less favorable to this happy result than was the unusual cleanliness of the city. Never since the autumn of 1749 had the city been seen in so cleanly a condition.

The total mortality amounted to 4,755 in New York and 1,841 in Brooklyn, and of these deaths 981 (only 20.63 per cent of all) in the former city and 466 (25.81 per cent) in the latter were accredited to zymotic causes. Cholera infantum was charged with only 49 deaths in New York and 34 in Brooklyn. The accompanying abstract of the zymotic mortality and of the total number and causes of deaths in the several wards presents an instructive lesson when examined in connection with the annual chart, which is found at the beginning of this chapter. The records and charts for Brooklyn, as presented in a subsequent section, are equally instructive. The remarks which the Deputy Registrar makes upon the diarrhoeal and the malarial fields in Brooklyn need to be perused by readers who inspect these charts and abstracts.

* The Annual Report of the Croton Aqueduct Commissioners for the year 1867, makes the following record of the rainfall in the Hudson river section of the Metropolitan District:

“ The total rainfall at Sing Sing Station during the year was 88.02 inches, while at Tarrytown Station, only about five miles in a straight line, distant, it was but 45.75 inches.

“ During the violent rain storms in June last, there fell at Sing Sing, between the hours of 6 p. m., June 16th, and 9 a. m., June 17th, 3.53 inches, and between 1 a. m., June 18th, and 2 a. m., June 19th (25 hours), there fell 10.12 inches—an aggregate in both storms of 13.7 inches.

† The mean total rainfall annually for twenty-five years, in the town of Flushing, Queens county, is 49.87 inches of water. See Report on Topography and Epidemics of New York. By Prof. Joseph M. Smith. Transactions of American Medical Association, 1860.

DEATHS FROM ZYMOTIC DISEASES.

NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHICAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the Quarter ending Saturday, December 31, 1868.

WARDS.	Deaths from Zymotic Diseases.										Deaths by Accident or Negligence. (Coroners' Inquests.)	Total Deaths from all Causes.	Total Population (in 1865).	Percentage of Zymotic Deaths on Total Mortality.	Death-rate per 1,000 Annually of the Population from Zymotic Causes.	Death-rate per 1,000 Annually of the Population from all Causes.
	Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-Cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Cholera Morbus & other Diarrhical Diseases.	Yellow Fever.	Other Zymotic Diseases.	Total Deaths from Zymotic Diseases.		
First	1	2	1	1	2	3	3	3	2	2	5	5	3	19	52	9,832
Second	1	1	1	1	1	1	1	1	1	1	1	1	1	10	13	1,194
Third	1	1	1	1	1	1	1	1	1	1	1	1	1	10	20	3,367
Fourth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	121	17,852
Fifth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	134	18,205
Sixth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	126	19,754
Seventh	1	1	1	1	1	1	1	1	1	1	1	1	1	10	242	38,962
Eighth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	153	30,098
Ninth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	209	38,504
Tenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	192	31,637
Eleventh	1	1	1	1	1	1	1	1	1	1	1	1	1	10	283	58,958
Twelfth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	410	23,250
Thirteenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	138	26,388
Fourteenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	149	24,382
Fifteenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	107	25,572
Sixteenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	171	41,972
Seventeenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	402	79,503
Eighteenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	224	47,613
Nineteenth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	501	38,945
Twentieth	1	1	1	1	1	1	1	1	1	1	1	1	1	10	353	61,884
Twenty-first	1	1	1	1	1	1	1	1	1	1	1	1	1	10	45	28,669
Twenty-second	1	1	1	1	1	1	1	1	1	1	1	1	1	10	257	47,501
Total	11	13	10	55	121	45	17	87	49	292	1	260	981	201	4,755	756,386
															20.63	5.40

a New York Hospital, 44. *b* City Prison, 2. *c* St. Vincent's Hospital, 18. *d* St. Francis' Hospital, 22. *e* House of Refuge, 2. *f* Infants' Hospital, 158. *g* Colored Orphan Asylum, 1. *h* R. C. Orphan Asylum, 1. *i* Ward's Island, 94. *j* Randall's Island, 7. *k* Bloomingdale Lunatic Asylum, 4. *l* Deaf and Dumb Asylum, 1. *m* New York Juvenile Asylum, 1. *n* Work House, 2. *o* Hobrow Orphan Asylum, 1. *p* R. C. Orphan Asylum, 1. *q* City Lunatic Asylum, 31. *r* Almshouse, 27. *s* Penitentiary, 6. *t* Small Pox Hospital, 2. *u* Charity Hospital, 116. *v* Epileptic and Paralytic Hospital, 4. *w* Total on Blackwell's Island, 187. *x* Colored Home Hospital, 148. *y* Nursery and Children's Hospital, 60. *z* St. John's Hospital, 31. *aa* Second Ward Hospital, 12. *ab* Bellevue Hospital, 188.

The decrease in the prevalence and the fatal force or *lethality* of the zymotic diseases in New York, from the beginning of September until the second week in December, was more considerable in degree and more obviously associated with external conditions of salubrity than had been noticed in the two previous years. The course of the death-rate in this fortunate period may be seen in the charts of mortality for three years in a subsequent section, compared with that in each of the two preceding years at corresponding periods. Columns of numerals would fail to convey the lesson so impressively as the charts do, because the eye at once aids the judgment. It certainly was a remarkable period of salubrity.

The mean temperature of November was forty-two degrees Fahrenheit, and in the first week of December it was thirty-two degrees, and in the second week twenty-eight degrees; and in those six weeks of lowest mortality the extreme range of temperature, day by day, was very moderate, though the weather was cold. There was in that period a total rainfall equivalent to eight and a half inches depth of water.

In analyzing the causes of death and the fluctuations of the death-rate in Brooklyn for the autumnal quarter of the year, the fact plainly enough appears that the outlying and imperfectly drained portions of that city failed to participate in the general decrease, or, at least, to the extent that the older and well drained sections enjoyed. For example, in the Eighth and Ninth wards of that city—a district that is in the transitional state and only beginning to receive its water supply and sewerage—the mortality for the four seasons of the year* compares with another district which enjoys the most thoroughly perfected drainage, namely the Third, Fourth and Eleventh wards, the older and more compactly built portion of the city, as follows:

NUMBER OF DEATHS.	OLD AND DRAINED.			NEW AND TRANSITIONAL.		Total mortality in the city.
	Third ward.	Fourth ward.	Eleventh ward.	Eighth ward.	Ninth ward.	
Winter quarter of year ending March 31st.	39	55	144	49	160	1,855
Spring do do July 4th.	40	72	105	57	151	1,743
Summer do do Oct. 3d.	48	84	116	140	308	3,379
Autumn do do Dec. 31st.	16	43	96	68	164	1,773

Such is the comparative view of mortality in these two districts of that city in 1868. They lie *vis à vis* to each other on elevated ground; and in 1875, if the present march of improvement continues, the newly-improved district will vie with the most highly improved portions of the old city on the Heights.

* The first, second and fourth quarters of the year are especially comparable.

In the city of New York there remains only a limited area of malarial and undrained ground. The Twelfth, Nineteenth and Twenty-second wards, the northern portion of Manhattan Island, produce autumnal malaria in numerous places, and the records of death bear testimony to the presence of it. Though the persistency and amount of the excess in the death-rate are not so strongly marked in the undrained sections of New York as in those of Brooklyn, it nevertheless is very noticeable and important. In the two sections that most fairly represent the contrasts which may be claimed to be wholly due to mere differences in the degree of completeness of surface drainage, namely the Tenth and Fourteenth wards, in the heart of the city, and the Twelfth and Nineteenth wards, the open and undrained region north and east of the Central park.

NUMBER OF DEATHS.	OLD AND DRAINED.		NEW AND TRANSITIONAL. (Imperfectly drained.)		Total mortality in city (exclusive of institutions).
	Tenth ward.	Fourteenth ward.	Twelfth ward.	Nineteenth ward.	
Winter quarter ending March 31st	263	161	203	391	4,948
Spring do July 4th	204	169	152	237	4,400
Summer do Oct. 3d	334	255	270	448	7,426
Autumn do Dec. 31st	192	149	146	177	3,946

Could we, with the same kind of absolute accuracy, extend this kind of comparison of the death-rates in the different quarters of the year throughout the suburban villages, particularly in those of Staten Island and the paludal portion of Westchester, the contrasts between the rates in spring and autumn would be more marked than in the malarial districts in the city; yet it is not chiefly the malarial fevers, so called, that do this violence to human life, but it is chiefly the bowel disorders, the increased mortality in infancy, and the general impairment of health, or failure to resist diseases, that bring about this increased mortality in regions that breed malaria at the close of summer.

These practical questions in hygiene have come to be the leading results of exact and classified observations upon the movements of the death-rate in particular localities in different seasons of the year.

DEATHS FROM ZYMOTIC DISEASES.

NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHEAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the year ending Saturday, December 31st, 1868.

DEATHS FROM ZYMOTIC DISEASES.																						
NEW YORK.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHEAL MALADIES AND OTHER ZYMOTIC DISEASES.																						
Registered during the year ending Saturday, December 31st, 1868.																						
WARDS.																						
Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-Cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Cholera Morbus and other Diarrheal Diseases.	Yellow Fever.	Other Zymotic Diseases.	Total Deaths from Zymotic Diseases.	Deaths by Accident or Negligence. (Coroners' Inquests.)	Total Deaths from all Causes.	Total Population (in Wards), Census of 1865.	Rate of Population to Square Mile. (Census.)	Percentage of Zymotic Deaths on Total Mortality.	Death-Rate per 1,000 Annually of the Population, from Zymotic Causes.	Death-Rate per 1,000 Annually, exclusive of the Mortality in Public Institutions.	Death-Rate per 1,000 Annually, of the Population from all Causes.	
First.....	6	51	2	3	7	9	59	33	142	36	491	6,952	41,050	28.92	14.36	47.50	49.83	28.92	14.36	47.50	49.83	
Second.....	1	1	1	2	1	1	7	4	5	2	1	3	5	56	82	1,104	9,950	7.14	3.35	46.90	46.90	
Third.....	2	19	8	13	6	3	52	32	20	15	82	3,367	23,447	26.83	6.53	24.35	24.35	26.83	6.53	24.35	24.35	
Fourth.....	2	9	3	16	8	6	36	31	28	143	649	17,352	133,447	24.66	9.22	37.40	37.40	24.66	9.22	37.40	37.40	
Fifth.....	2	9	3	16	8	6	36	31	28	143	649	17,352	133,447	24.66	9.22	37.40	37.40	24.66	9.22	37.40	37.40	
Sixth.....	4	20	9	13	5	5	31	26	27	180	22	697	19,764	151,054	25.82	9.11	34.73	25.82	9.11	34.73	35.33	
Seventh.....	4	46	7	27	11	1	3	113	87	29	313	37	1,103	36,902	119,282	28.98	8.47	29.84	28.98	8.47	29.84	29.84
Eighth.....	3	17	10	12	11	1	67	40	31	200	36	873	30,098	103,786	33.94	6.91	29.05	30.09	6.91	29.05	29.05	
Ninth.....	5	48	4	16	4	1	61	65	37	250	36	1,052	38,504	77,004	23.76	6.49	31.40	38.50	6.49	31.40	31.52	
Tenth.....	1	51	13	20	9	7	75	64	26	281	23	1,994	31,537	185,512	24.27	8.91	31.49	31.53	8.91	31.49	31.52	
Eleventh.....	2	15	67	26	15	11	163	136	41	519	41	1,687	58,953	196,510	30.71	8.82	27.17	58.95	8.82	27.17	28.61	
Twelfth.....	1	32	33	12	9	4	79	617	181	1,331	36	2,491	28,259	5,195	57.44	36.84	26.83	28.00	36.84	26.83	28.00	
Thirteenth.....	1	7	40	6	20	11	72	48	46	233	21	739	26,598	155,224	31.53	8.93	28.00	26.80	8.93	28.00	28.00	
Fourteenth.....	6	33	9	9	4	5	22	22	10	169	35	736	23,382	125,880	22.90	7.22	31.39	31.47	7.22	31.39	31.47	
Fifteenth.....	1	22	5	5	5	4	5	5	15	95	8	463	25,572	82,400	20.52	2.71	17.90	18.10	2.71	17.90	18.10	
Sixteenth.....	4	37	12	9	4	8	70	45	23	214	21	911	41,972	69,953	23.40	6.99	21.70	21.70	6.99	21.70	21.70	
Seventeenth.....	1	33	101	45	42	19	12	11	54	713	32	2,877	79,663	153,000	30.00	8.88	29.88	29.88	8.88	29.88	29.88	
Eighteenth.....	8	36	13	22	0	2	102	56	278	25	1,170	47,613	31,107	23.55	21.76	24.70	24.70	21.76	24.70	24.70	24.70	

Nineteenth.....	15	7	44	16	23	14	17	41	1	114	217	....	154	683	65	2,477	39,045	16,713	26.77	16.59	31.75	62.01 <i>j</i>
Twentieth.....	1	23	104	26	19	19	5	21	1	152	93	....	67	520	49	1,781	61,884	91,006	29.19	8.40	28.04 <i>k</i>	23.04 <i>l</i>
Twenty-first.....	2	8	57	21	18	16	3	19	2	87	92	....	95	420	177	1,857	38,609	53,255	22.62	10.66	27.41	47.77 <i>m</i>
Twenty-second..	1	13	61	21	30	35	2	12	4	157	123	....	37	406	43	1,632	47,361	21,334	32.37	10.47	32.20	32.35 <i>n</i>
Totals.....	24	200	861	276	342	317	130	326	9	1,834	1,495	1	1,231	7,455	877	24,880	726,386	43,564	29.95	10.26	28.45	34.28

a Castle Garden and E. Depot, 18; Fort Columbus, 4; Fort Wood, 1; Total, 23; *b* New York Hospital, 108; *c* City Prison, 11; *d* St. Vincent's Hospital, 91; St. Luke's Home, 2; *e* Ludlow Street Jail, 1; *f* St. Francis' Hospital, 86; House of Refuge, 6; Infants' Hospital, 938; Colored Orphan Asylum, 6; R. C. Orphan Asylum, 1; N. Y. Juvenile Asylum, 3; *g* St. Joseph's Orphan Asylum, 2; House of Good Shepherd, 2; Leake and Watts Asylum, 1; Ward's Island, 706; Randall's Island, 60; Bloomingdale Lunatic Asylum, 21; Deaf and Dumb Asylum, 1; *h* R. C. Orphan Asylum, 2; *i* Children's Aid Society, 3; *j* Work House, 6; Hebrew Orphan Asylum, 1; R. C. Orphan Asylum, 3; Fever Hospital, 7; Women's Hospital, 3; City Lunatic Asylum, 142; Almshouse, 150; Penitentiary, 19; Small Pox, 12; Charity Hospital, 470; Epileptic and Paralytic Hospital, 11; Total on Blackwell's Island, 806; Colored Home Hospital, 106; Nursery and Child's Hospital, 176; Charity Hospital, 103; *k* Mount Sinai Hospital, 45; Institution for the Blind, 1; *l* Bellevue Hospital, 77; Home for the Friendless, 20. *m* N. Y. Orphan Asylum, 3; House of Mercy, 1. Total Deaths in Public Institutions, 1,218.

MARRIAGE REGISTRATION IN THE YEAR.

New York and Brooklyn continue to be the only places in the State in which any degree of obedience is given to the statutes concerning marriage registration. This branch of vital registration is based upon the law which was enacted by the Legislature in 1847,* and then, and even since that date, this law has been obligatory upon every person who solemnizes a marriage in the State of New York. How much longer the State will permit such inattention to its statutes is no special concern of the officers of the Metropolitan Board of Health; but, from the stand-point of experience in this branch of vital registration in the Metropolitan District, it is plain enough that the people of the Empire State are wronged, and their social and moral interests are jeopardized by such neglect on the part of the State.

The statute which requires the public registration of marriages in this State was enacted in 1847. It directed that once in each year, throughout the State, the clerks of the several school districts, or some one of the school trustees, shall report the names, residence and age of all persons that have married during the year, and the names of the clergyman or other persons who have solemnized and witnessed the ceremonies; the persons last mentioned to make and preserve a record of the same, and, for the final public registration, a transcript from such record was to be transmitted to the Secretary of State at Albany, through the town clerk; but the City Inspector and, under the existing laws, the Metropolitan Board of Health would be held to the duty elsewhere required of town clerks. The law passed in 1853† confirmed and amplified these requirements in regard to the city of New York, and by the Sanitary Act of 1866 the clergymen and magistrates throughout the Metropolitan District are required to make prompt and full returns concerning all the marriages they solemnize. Hence the responsibility for these and all other certified returns of vital statistics for about one-third of the entire population of the State is concentrated upon this Board of Health.‡

Hitherto the statutes relating to Vital Statistics and Registration beyond the limits of the two Metropolitan cities have practically been construed as being simply as permissive, and not as commandatory. Hence they are universally disregarded in all towns beyond the limits of the Metropolitan District; while in the rural portions of this District the certified returns of marriages, as well as those of births and deaths, have been altogether voluntary. The bare knowledge of the fact that certified records of all the marriages within the Metropolitan District were registered without cost by the Metropolitan Board of Health, and that the statutes required such registration, has led to the commencement of the registration for each county within the District. Not less than 760 persons, who have been

* General Statutes of the State of New York, Part I, Chapter CLII. Act passed April 8th, 1847.

† General Statutes, Chapter LXXV. Act passed April 2, 1853.

‡ Total population in the Metropolitan District, according to the census of 1865, was 1,198,331, and the total population of the State was 3,831,777.

married during the year ending December 31st, 1868, in rural towns in this District, have had the properly certified record of their marriage forwarded to the Bureau of Vital Statistics at the central office of this Board.

It is not for the Registrar to decide whether this statute relating to the returns of vital records from the rural portions of the Metropolitan District should any longer be construed as merely *permissive*. Certain it is that these laws ought to be imperative, both as regards the persons and the public authorities concerned. In the two previous annual reports from this Bureau, the leading facts relating to this subject have been fairly presented, and the duty of providing adequate means for gathering in the complete returns of marriages, as well as of births and deaths, throughout the entire area of the Metropolitan District, must in some way be performed, and the requirements of the statutes enforced.

Desiring to facilitate and prepare the way for the more general regard for the regulations concerning marriage registration, the Board directed the Registrar to issue a circular to clergymen throughout the Metropolitan District, accompanied by a summary of the statutes relating to marriage contracts and records. The latter document was carefully compiled by Dorman B. Eaton, Esq., the legal counsellor of the Board, and will be found, together with the circular, in the concluding pages of this section.

There is one more fact that must be stated concerning the duties required of clergymen in regard to certified returns for public registration of marriages. The laws of the State and the ordinances of the Board hold them responsible for correct returns, and for the proper identification of the persons married, the suitableness of their ages, etc., etc.; and yet the statutes wholly fail to provide any kind of civil registration and ante-nuptial record, by persons who plight their vows of matrimony. Clergymen of all denominations, in their communications to this Bureau, have frequently made known their wishes that some plan might be adopted by which the persons when about to enter upon the marriage relation should register their own personal records, and obtain the proper legal authorization for the solemnization of their marriage. This is a most important view of a public and social duty that hitherto has not been required by the laws of the State of New York. The moral sanctions of the solemnization are not diminished in their importance by such a procedure, and there is no good reason why this feature of the Civil Code of France, and of some of our American States, should not be placed upon the statute books of New York. Upon this point we would repeat the statement made in our second annual report.

As the entire care of this branch of registration, has for two years and upwards, been committed by us to the special supervision of Mr. John Bowne, the chief clerk in this Bureau, we have requested him to draw up a plain statement of the leading facts which his observation and experience in dealing with the cases daily requiring his attention and correspondence, show to be most important for public and official consideration. His statement follows the tabulated records of marriage here presented.

Report of Marriages for the Three Months ending June 30th, 1868, in the City and County of New York.

1868. MONTHS.	COLOR.		NATIVITY.		CONDITION.													
	TOTAL.	White.	Black.	FOREIGN.		NATIVE.		NOT STATED.		FIRST MARRIAGE.		SECOND MARRIAGE.		THIRD MARRIAGE.		FOURTH MARRIAGE.	NOT STATED.	
				Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
April.....	613	605	10	416	373	183	233	13	9	473	463	73	84	0	.....	.....	60	68
May.....	744	723	21	553	511	178	215	13	15	572	604	101	74	6	5	1	64	61
June.....	635	628	7	432	383	189	239	14	13	496	488	73	73	4	5	.....	62	69
Total...	1,994	1,956	38	1,401	1,270	553	687	40	37	1,541	1,555	247	231	19	10	1	186	198

AGES OF PERSONS MARRIED.																										
1868. MONTHS.	Under 20.		20 to 25.		25 to 30.		30 to 35.		35 to 40.		40 to 45.		45 to 50.		50 to 55.		55 to 60.		60 to 65.		65 to 70.		70 to 75.		Not Stated.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
April...	6	95	195	261	205	157	96	42	53	26	25	19	14	4	12	2	4	3	.....	.....	.....	.....	.....	.....	.....	.....
May.....	9	131	212	331	256	167	132	49	63	33	32	14	16	7	12	3	4	1	.....	.....	.....	.....	.....	.....	.....	.....
June.....	4	138	195	268	214	127	100	45	43	32	30	11	18	2	6	3	5	1	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	19	366	602	863	675	451	337	136	159	91	87	44	48	13	30	8	11	6	5	1	4	1	1	.....	15	14

Report of Marriages for the Three Months ending September 30th, 1868, in the City and County of New York.

1868. MONTHS.	COLOR.		NATIVITY.		CONDITION.							
	Total		Foreign.		Native.		Not Stated.		First Marriage.		Second Marriage.	
	White.	Black.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
July.....	524	10	369	342	142	171	13	11	411	440	63	59
August.....	584	575	9	441	461	132	168	11	15	449	447	77
September.....	564	568	16	387	343	173	216	24	25	435	456	65
Total.....	1,692	1,457	1,197	1,090	447	565	48	51	1,295	1,303	231	191
											10	11
											1	1
											109	167

AGES OF PERSONS MARRIED.

1868. MONTHS.	Under 20.		20 to 25.		25 to 30.		30 to 35.		35 to 40.		40 to 45.		45 to 50.		50 to 55.		55 to 60.		60 to 65.		65 to 70.		70 to 75.		Not Stated.	
	Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
July.....	10	113	166	206	177	112	90	47	41	19	22	12	9	4	0	3	2	1	1	1	1	1	1	1	1	
August.....	5	93	152	237	217	137	93	61	54	28	30	19	16	3	4	1	3	2	1	1	1	1	1	1	1	
September.....	4	112	163	243	185	135	110	42	60	23	36	6	17	3	6	4	3	1	1	1	1	1	1	1	1	
Total.....	19	318	475	693	579	384	293	159	145	70	57	37	42	10	16	8	8	3	3	3	3	3	3	3	3	

Report of Marriages for the Three Months ending December 31st, 1868, in the City and County of New York.

1868. MONTHS.	COLOR.		NATIVITY.				CONDITION.												
	Total.		Foreign.		Native.		Not Stated.		First Marriage.		Second Marriage.		Third Marriage.		Fourth Marriage.		Not Stated.		
	White.	Black.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
October.....	623	599	24	394	175	216	17	13	472	477	82	64	3	2	.....	.....	66	80
November.....	658	643	15	408	207	239	12	11	499	512	76	73	10	5	.....	1	73	67
December.....	374	359	15	227	196	147	.....	1	320	308	40	40	4	1	.....	.....	20	25
Total.....	1,655	1,601	54	1,097	908	629	632	29	25	1,281	1,297	198	177	17	8	1	159	172

AGES OF PERSONS MARRIED.																											
1868. MONTHS.		Under 20.		20 to 25.		25 to 30.		30 to 35.		35 to 40.		40 to 45.		45 to 50.		50 to 55.		55 to 60.		60 to 65.		65 to 70.		70 to 80.		Not Stated.	
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
October.....	98	143	268	142	117	52	50	26	24	12	14	7	9	4	4	3	2	.....	4	.....	1	.....	5	10			
November.....	4	107	193	279	120	43	55	30	26	10	17	6	9	3	2	2	1	.....	.....	2	.....	3	3				
December.....	1	60	120	171	93	70	22	25	15	16	4	12	6	3	.....	.....	.....	.....	.....	.....	.....	1	3				
Total.....	5	265	456	718	599	410	307	117	130	71	66	26	43	19	21	7	9	5	3	.....	4	.....	3	1	9	16	

Report of Marriages in the City of New York for the Twelve Months ending December 31st, 1868.

1868. MONTHS.	TOTAL	COLOR.		NATIVITY.				CONDITION.											
		FOREIGN.		NATIVE.		NOT STATED.		FIRST MARRIAGE.		SECOND MARRIAGE.		THIRD MARRIAGE.		FOURTH MARRIAGE.		NOT STATED.			
		White.	Black.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.		
January.....	569	553	16	404	378	152	180	13	11	430	443	70	63	6	2	.....	.....	63	61
February.....	547	526	11	379	358	156	176	12	13	429	420	53	51	5	3	.....	.....	60	73
March.....	469	456	13	340	308	126	157	3	4	345	340	74	55	3	1	1	.....	46	73
For the quarter ending March 31st..	1,585	1,545	40	1,123	1,044	434	513	28	28	1,204	1,203	197	169	14	6	1	.....	169	207
April.....	615	605	10	416	373	186	233	13	9	473	463	73	81	9	.....	.....	.....	80	68
May.....	744	723	21	553	514	178	215	13	15	572	604	101	74	6	5	1	.....	84	61
June.....	635	628	7	432	383	189	239	14	13	490	488	73	73	4	5	.....	.....	62	69
For the quarter ending June 30th..	1,994	1,956	38	1,401	1,270	553	687	40	37	1,541	1,555	247	231	19	10	1	.....	186	194
July.....	524	514	10	359	342	142	171	13	11	411	400	63	50	2	1	.....	.....	48	64
August.....	584	575	9	411	401	132	168	11	15	449	447	85	77	3	5	1	.....	46	55
September.....	584	568	16	387	343	173	216	24	25	436	456	83	55	5	5	.....	.....	61	68
For the quarter ending Sept. 30th..	1,692	1,657	35	1,197	1,086	447	555	48	51	1,295	1,303	231	191	10	11	1	.....	155	187
October.....	623	599	24	411	394	175	216	17	13	472	477	82	64	3	2	.....	.....	86	80
November.....	658	643	15	439	408	207	239	13	11	499	512	76	73	10	5	.....	1	73	67
December.....	374	359	15	227	190	147	177	.....	1	310	308	40	40	4	1	.....	.....	20	25
For the quarter ending Dec. 31st..	1,655	1,601	51	1,097	998	520	632	29	25	1,281	1,297	198	177	17	8	.....	1	159	172
Total for twelve months ending '68, 6,920	8,750	8,618	167	4,818	4,318	1,963	2,387	145	141	5,321	5,358	873	768	60	35	3	1	669	764

Report of Marriages in the City of New York—Continued.

AGES OF PERSONS MARRIED.

MONTHS.	Under 20.		20 to 25.		25 to 30.		30 to 35.		35 to 40.		40 to 45.		45 to 50.		50 to 55.		55 to 60.		60 to 65.		65 to 70.		70 to 80.		Not Stated.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.		
January.....	3	110	163	250	208	116	100	54	48	16	16	7	14	8	6	...	4	1	2	...	...	...	1	...	4	7
February.....	5	113	163	217	181	130	111	45	38	15	23	13	11	6	6	1	4	...	2	...	...	...	...	2	7	
March.....	5	84	150	206	128	83	84	49	40	23	29	14	9	4	10	1	6	2	...	...	...	5	...	3	3	
Total.....	13	307	476	673	517	329	295	148	126	54	68	34	34	18	22	2	14	5	4	...	6	...	1	...	9	17
April.....	6	95	165	264	205	157	96	42	53	26	25	19	14	4	12	2	2	4	3	...	1	...	...	...	3	2
May.....	9	133	212	331	250	167	132	49	63	33	32	14	16	7	12	3	4	1	1	...	2	...	...	...	5	6
June.....	4	138	195	268	214	127	109	45	43	32	30	11	18	2	6	3	5	1	2	1	1	1	1	...	7	6
Total.....	19	366	602	863	675	451	337	136	159	91	87	44	48	13	30	8	11	6	6	1	4	1	1	...	15	14
July.....	10	113	160	208	177	112	90	47	41	19	22	12	9	4	9	3	2	1	...	...	...	...	...	4	5	
August.....	5	93	152	237	217	137	93	61	54	28	39	19	16	3	4	1	3	2	1	...	...	...	...	...	4	3
September.....	4	112	163	248	185	135	110	42	50	23	36	6	17	3	6	4	3	...	4	1	...	1	...	...	6	9
Total.....	19	318	475	693	579	384	293	150	145	70	97	37	42	10	19	8	8	3	5	1	...	1	...	10	17	
October.....	...	98	143	268	250	142	117	52	50	26	24	12	14	7	9	4	4	8	2	...	4	...	1	1	5	10
November.....	4	107	193	279	325	175	120	43	55	30	26	10	17	6	9	3	3	2	1	...	...	...	2	...	3	3
December.....	1	60	120	171	124	93	70	22	25	15	16	4	13	6	3	...	2	...	...	...	...	...	...	1	3	
Total.....	5	265	436	718	599	410	307	117	130	71	66	26	43	19	21	7	9	5	3	...	4	...	3	1	9	16
Grand total....	56	1,256	2,009	2,947	2,370	1,574	1,232	551	560	256	318	141	167	60	92	25	42	17	18	3	14	2	6	1	43	64

Abstract of Marriages in the City of New York for the Years 1866, 1867 and 1868.

MONTHS.	1866.						1867.						1868.					
	NATIVITY.						NATIVITY.						NATIVITY.					
	FOREIGN.			NATIVE.			FOREIGN.			NATIVE.			FOREIGN.			NATIVE.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
January.....	256	256	512	256	256	512	364	335	699	167	56	223	404	378	782	152	180	332
February.....	228	228	456	228	228	456	334	306	640	146	13	159	379	358	737	156	176	332
March.....	229	229	458	229	229	458	378	343	721	124	13	137	340	364	704	124	157	281
April.....	274	274	548	274	274	548	425	405	830	202	22	224	416	373	789	186	233	419
May.....	461	461	922	461	461	922	568	521	1,089	176	22	198	553	514	1,067	178	215	393
June.....	523	523	1,046	523	523	1,046	520	508	1,028	187	14	201	432	383	815	180	239	419
July.....	601	601	1,202	601	601	1,202	400	370	770	164	16	180	369	342	711	142	171	313
August.....	554	554	1,108	554	554	1,108	401	367	768	123	7	130	384	401	785	132	168	300
September....	604	604	1,208	604	604	1,208	481	433	914	151	13	164	387	343	730	173	216	389
October.....	787	787	1,574	787	787	1,574	471	433	904	186	17	203	431	394	825	175	216	391
November....	683	683	1,366	683	683	1,366	420	380	800	143	15	158	439	408	847	207	239	446
December....	612	612	1,224	612	612	1,224	283	253	536	152	6	158	227	196	423	147	177	324
Grand Total ..	5,792	5,792	11,584	5,792	5,792	11,584	5,051	4,654	9,705	1,890	203	2,093	4,818	4,398	9,216	1,963	2,387	4,350

REPORT ON MARRIAGE REGISTRATION.

To the Registrar of Vital Statistics:

The three facts that appear most prominently on the Marriage Registers for the year 1868, as compared with the previous year, are these, namely, First, a diminution in the number of marriages registered; second, an increased proportion of marriages among the native-born population; and third, an increased degree of accuracy, and, therefore, of value, in the individual returns.

Before attempting any analysis of, or comment upon, these three very important facts, it seems fitting they should be stated in some concise statistical form, that each one may be exactly weighed and measured in its relation to the other two, and that the increase or decrease in each may be accurately known. The following comparative table of the marriages registered in the three years during which the Bureau of Vital Statistics has been under the control of the Metropolitan Board of Health, will fully answer the purpose of an introduction to any remarks that may follow.

YEARS.	No. of Marriages.	FOREIGN BORN.		NATIVE BORN.		NATIVITY NOT STATED.		PERSONS MARRIED.
		Males.	Females.	Males.	Females.	Males.	Females.	Totals.
1866.....	5,793	3,659	3,428	1,351	1,588	171	776	11,584
1867.....	7,144	5,051	4,651	1,890	2,290	203	210	14,288
1868.....	6,026	4,818	4,398	1,963	2,387	145	141	13,852
	-218	-233	-256	+73	+107	-58	-69	-436
	+1,134	+1,159	+970	+612	+799	-637	-635	+2,866

The numbers marked plus and minus, show the increase and decrease in 1868 as compared with 1867. In the second line, the years 1866 and 1868, are compared in the same manner.

THE MARRIAGE-RATE.

During the year 1868 the marriages of 13,852 persons were registered in the city of New York, against 14,288 in 1867, and 11,584 in 1866. This is equivalent to an annual rate of 13.85, 14.20 and 11.58 in one

thousand inhabitants, in each of the three years, in the order in which they are mentioned.

It is well known that marriage-rates fluctuate year by year, in accordance with large general facts over which individuals can exercise no authority, and that they are in no way affected by the temper and wishes of the people. These laws operate in uniformity with the general business prosperity of the community and the rise or fall of the earnings of the mass of the people, above or below the average.* The diminution in the number of marriages therefore must be charged to the great depression in trade, the scarcity of labor, and the advanced prices of rents and articles of food that characterized the year that has just closed.

To offset this tendency to a decline in the number of marriages there was a largely increased population over the preceding years, and, consequently, a considerable accession of both sexes to that period in life at which marriage may be contracted without violation of either physiological or statutory laws. What this increase was, in the numbers of the sexes who arrived at marital ages, cannot be known for the want of an accurate census and a knowledge of the exact rate of increase in the population; but it is doubtful whether it was sufficient to overcome the effect of the darkened prospects and depressed business activity so loudly complained of among all classes of the community.

But the marriage-rate needs to be corrected by the addition of a large number of names to the registers, of persons who are known to have been married during the year, although the fact was never returned to the Bureau of Vital Statistics. Under existing circumstances the extent of this deficiency cannot be told; the fact of a deficiency can, however, be incontestably proved by two circumstances, either of which would be sufficient, and both of which reveal the names of the clergymen who are delinquent in making returns of the marriages they solemnize.

First. It has been ascertained by careful examination, in repeated instances, that marriages have been advertised in the various newspapers of the city, religious and secular, which were never duly returned for registration. These advertisements, as is well known, contain the names of the contracting parties, the date and place of marriage, and the name of the officiating clergyman. Here, then, is the positive and irrefragable testimony of the parties themselves that the marriage contract had been consummated. The registers furnish the negative proof of the neglect of the clergyman who solemnized the marriage to make the return required by law.

Second. The registers are searched, nearly every day, by persons who desire transcripts of marriages, of whose solemnization no legal proof can be obtained. The searchers are sometimes deserted wives, the victims of faithless husbands, negligent clergymen and vicious marriages; sometimes

* Compare Buckle's *History of Civilization in England*, vol. I, pp. 23, 24, New York, 1863, with Porter's *Progress of the Nation*, vol. II, pp. 244, 245, London, 1838, and the *Journal of the Statistical Society*, vol. XV, p. 185.

they are grief-stricken parents in search of the evidence of the marriage of a deluded and dishonored daughter, or a son inveigled into a disreputable union with some designing adventuress; more frequently still, they are widows, dependent upon their own exertions for support, with a family of half-orphaned children, whose just claim upon the government or heirship to some small but sadly-needed fortune depends upon the evidence of a marriage of which no record has been kept, and to whose solemnization no witness can be found. These are daily occurrences in the Bureau of Vital Statistics, and the searches refer to dates both immediate and remote. In such cases, no doubt is left of the fact of marriage, although no legal testimony of the fact exists.

Notwithstanding these evidences of deficiencies, the marriage-rate in New York compares favorably with that in other cities, where the appliances for securing prompt returns are more complete and effective. Very full and exhaustive comparisons of these rates were made in the two preceding reports of the Bureau of Vital Statistics, so that it does not seem necessary to enter into any further detail. The marriage-rate shows that society in the Metropolitan District is pervaded by a healthful moral tone, and the decrease is not sufficient to cause any anxiety in regard to its general business prosperity or its average social condition.

The value and importance of this branch of vital statistics has also been amply set forth in preceding reports, and various methods have been discussed the adoption of which would lead to more complete registration. The experience and observation of the past three years are sufficient to prove, if such proof were needed, that no merely voluntary system can ever attain to a satisfactory degree of completeness. There will always be some, among those authorized to solemnize and certify marriages, who will neglect the interests of the parties they marry, and violate their obligations to the law and the State, in spite of any effort that may be made to induce them to a better course. And there is another class who will continue to palliate and excuse their own deficiencies by pointing out the deficiencies of their brother clergymen. This is a continuation of that ancient Phariseism, so justly rebuked eighteen centuries ago, which takes especial note of the shortcomings of others and quiets a disturbed conscience with the phrase—"I am no worse than my neighbors." Such child-play among those who are authorized by law to solemnize marriage is by no means uncommon, and it has existed so long as not only to become chronic but, it is feared, irremediable.

In view of these facts it would seem to be necessary that the subject of vital registration should be reviewed, in all its branches, by legislators and statesmen, and a plan adopted similar to that which in other States and countries has been found adequate to accomplish the desired object. An ante-nuptial license would be an improvement upon the present system, and the duties could be engrafted upon those already performed by the Bureau of Vital Statistics, without any material increase in cost or labor. A license desk, under the charge of a proper person, quite as capable as any

clergyman or magistrate, to judge of the fitness of the parties wishing to enter the marriage relation; the license to be returned by the person solemnizing the marriage, and a penalty attached to all the parties who were engaged in marriage ceremonials for which no license had previously been granted, would undoubtedly produce good results. And if marriages performed in violation of these restrictions were held to be illegal and void, it would have the effect of compelling the parties themselves, as well as parents and relatives, to see that the law was complied with in every particular, before the marriage was finally consummated. This might possibly have the effect of driving certain graceless couples into other States, in order to carry out their designs, whatever they might be, but it would very much improve the value of the marriage returns, and would certainly secure these two benefits of vital registration, namely, the identification of the family, and the rights of children and heirs to their names and property. Another plan, somewhat more expensive, but probably quite as good as the one above suggested, was recommended in the last annual report of this Bureau: a semi-annual canvass of the city, to discover and prevent delinquencies. This plan, however, is better adapted to secure complete registration of births than of marriages, but it would undoubtedly be a great improvement on the voluntary system now in vogue. The success of this Bureau in securing returns of marriages, under a purely voluntary system, which divides the responsibility for a failure in making them between half a dozen different persons, is believed to have been without precedent. But this fact should not be allowed to deter the Metropolitan Board of Health from extending its methods, or adopting others which shall have the effect of rendering this branch of vital registration absolutely and exhaustively complete.

PROPORTION OF MARRIAGES AMONG THE NATIVE AND FOREIGN-BORN POPULATION.

The experience of the past three years shows, that while there has been considerable fluctuation in the number of the foreign-born population whose names have been placed upon the marriage registers, there has been a constant increase in number of native-born men and women, so registered. The comparative numbers read thus: In 1866, foreign, 7,987 (3,659 males, 3,428 females); native, 2,939 (1,351 males, 1,588 females). In 1867, foreign, 9,705 (5,051 males, 4,654 females); native, 4,170 (1,890 males, 2,280 females). In 1868, foreign, 9,216 (4,818 males, 4,398 females); native, 4,350 (1,963 males, 2,387 females).

This is certainly a very excellent exhibit, from the fact that nearly the entire deficiency in marriage registration is made up of native couples. It is barely possible that the obligations and duties of the marriage relation are assumed with a greater degree of recklessness as to the result, and with less forethought, among the foreign-born, than among the native population, but there are no statistics to prove the fact—if fact it be. But

there is undoubtedly a stricter observance of the Registry laws among the former than among the latter. This may be accounted for partly by the circumstance that there are interests in other countries that require the legal testimony which the marriage registers here alone can furnish, and partly by the custom of registration, that in older countries has become a fixed and definite duty, which all people not only obey at home, but carry with them abroad. An imperial government, dealing with its subjects as parent with child, and enforcing obedience to the laws with a rigor and certainty in detecting their violation, which it is probable no popular government can ever know, is very different from a republic, in which any attempt at interference with the social relations is resented as an infringement of personal rights and individual privileges. But all these things have weight; and in seeking a home on our welcoming shores, these emigrating Europeans bring with them the habit which use had bred in the fatherland, and we see one of its results in the birth and marriage registers.

In the registration of the marriages among foreign-born inhabitants, there has been that uniform variation in totals that would naturally be expected to follow the fluctuation in marriage-rates. But in the registration of the same event among the native population, there has been a steady and gradual increase, which has nearly doubled in the three years. There can be little doubt that this has arisen from a growing interest in, and an augmented knowledge of, the social, moral and economical importance and value of this kind of vital registration. Something is also due to the individual faithfulness of clergymen and others, in making returns, for these, although still deficient, as has been shown in a preceding section of this report, are far more nearly complete than ever before in the history of marriage registration in the State of New York. The fact that, prior to the organization of the Metropolitan Board of Health, only 49,131 marriages had been registered in the city of New York in nearly twenty years, while since that time 19,862 marriages have been registered in three years, proves conclusively, without any further analysis or argument, that there has been an increased respect for the moral, as well as legal obligation, to obey the requirements of the statutes regarding the certifying and forwarding of marriage returns. For it is not possible that all of this increase is due to the difference in population; and the fact is every where palpable that the general dissemination of knowledge in regard to these duties, which has taken place through the exertions made by the Bureau of Vital Statistics, under the forms authorized by the Metropolitan Board of Health, has had a very large share in producing these exceedingly gratifying results.

If the truth could be fully established it would probably be found that there are nearly as many marriages, year by year, among the native as among the foreign-born population. But in the absence of accurate statistical data it would be useless to speculate further upon the differences in the returns. As the record stands, we learn that in 1868 there was an increase of 180 in the number of the former who were married and a diminution of 489

in the number of the latter, as compared with 1867, while there was an increase in both classes of 1,411 in the number of native-born and of 2,129 in the number of foreign-born citizens married in 1868, as compared with the registration returns for 1866. The plain fact that a more general and widespread obedience to the registry laws is to be found among our naturalized than among our native citizens seems here to be definitely and satisfactorily set forth; and it is to be hoped that it will finally result in bringing the advantages of this privilege of registration which the State accords to its citizens into better repute, and lead to renewed care, on the part of those who make, as well as of those who solemnize marriage contracts, in returning the proper vouchers to the Bureau of Vital Statistics for registration.

THE INCREASED ACCURACY OF THE RETURNS.

There has been much time, labor and study bestowed upon measures that would insure the greatest degree of accuracy and thoroughness in the various branches of vital registration. From the first the Metropolitan Board of Health adopted a very high standard, and it is now very generally believed that no city in the world possesses a more comprehensive registration of those facts in each branch of vital statistics, which are held to be of the most value to scientific men and to statisticians. The most scrupulous care and exactness have been required in filling out the necessary blanks, and it is greatly to the credit of the clergymen who make these returns that the request has been complied with in every instance, save in the few where the facts were either refused or not known.

The table presented on the first page of this report contains the evidence of this care in regard to one event only—that of the nativity of married persons. But the other statistical abstracts herewith presented show the same exactness in other respects, and give great cause for congratulation that this purely voluntary labor has been so uniformly well done. In 1866 there were 1,558 names of persons placed upon the marriage registers whose nativity was not stated. In 1867 the number decreased to 413, while in 1868 there were only 286 names registered under this head. This very materially increases the value of these returns, and may be regarded as the measure of the respect that the clergymen and priests of the city of New York bear for the civil laws. The more intelligent of all denominations yield to a strict observance of the duties that devolve upon them, whether ecclesiastical or civil, and it is believed that this fact can nowhere be more adequately verified than in the very circumstantial and trustworthy returns of the history of the 13,852 persons who were married in New York during the past year.

THE EFFORTS MADE DURING THE YEAR TO SECURE COMPLETE RETURNS.

In the two preceding reports of the Bureau of Vital Statistics the importance and value of this branch of vital registration, whether economical, moral or social, have been set forth in very plain and unmistakable

terms. Besides this, a continuous correspondence has been kept up between the officers of the Bureau and the clergymen of the Metropolitan district; circulars and blanks have been scattered without stint, and the press, both religious and secular, has been invoked from time to time to aid in bringing the subject to the notice of the clergy and the public.

Nevertheless, there still seems to be a lamentable degree of ignorance among all classes who are required to make these returns. And it is very probable that this fact, namely, ignorance of the law and of their duties under it, has more to do with the deficiencies than arises from wilful evasion of the law, or neglect in fulfilling the obligations imposed by the statutes upon those who solemnize marriages. In accordance with this view every effort consistent with an economical administration of the duties of the Bureau has been made to acquaint all clergymen who were known to reside in the Metropolitan Sanitary District with their duties under existing marriage laws, and early in the summer of 1868 an abstract of the statutes of New York relating to marriage ceremonies and the duty of persons authorized to solemnize marriage, carefully revised by the legal counselor and published by order of the Metropolitan Board of Health, was in like manner distributed very widely among the classes interested in such knowledge. The results of these increased efforts to educate the people of the district in regard to the important influence of these legal forms upon the moral and social well-being of society, are very clearly seen in the increased number and value of the returns.*

* The following circular and abstract of the Marriage Laws was issued in June, and had its full share in producing these results:

METROPOLITAN BOARD OF HEALTH,
BUREAU OF VITAL STATISTICS, No. 301 MOTT STREET, }
NEW YORK, June, 1868. }

To Rev.

SIR—The system of Marriage Registration that is now in operation under the supervision of the Metropolitan Board of Health, derives its authority from statutes that were enacted by the Legislature in 1830, 1841, 1847, 1853, 1866 and 1867. It is, in effect, a voluntary system; for the completeness and accuracy of the registration depends upon the voluntary and individual faithfulness of the clergymen and magistrates whose duty it is, under the laws, to make certified returns upon the marriages they solemnize.

The past two years' experience warrants the belief that but few clergymen neglect to make the required returns for marriage in the city of New York. But there has been much deficiency in the returns of marriages in the counties of Kings, Queens, Westchester and Richmond. This failure has resulted from several causes, the chief one being a misapprehension of the vital importance of this kind of registration, and of the moral as well as legal obligation strictly to obey the requirements of the statutes and the Sanitary Code regarding the certifying and forwarding of returns upon every marriage within five days from the date of its occurrence. And, as respects the deficiency in the returns from the rural towns of the Metropolitan District, the fact has not come to be generally and clearly understood that precisely the same provisions of the statutes and the Sanitary Code concerning the certified returns of marriage apply alike in all the towns of the Metropolitan District as in the cities of New York and Brooklyn. (See section 13 of the Health Act, 1866 and 1867, and sections 13, 14 and 15 of the Sanitary Code, 1866 and 1867.)

It is desired that hereafter every marriage which is solemnized in New York, Westchester, Richmond and Queens counties should be certified and "returned" to the central office of

Notwithstanding the almost prodigal use of these means, reports continue to come in that there are clergymen who even yet do not know that existing laws require them to secure the registration, in a definite form, of all the marriages they solemnize. Only a few days ago, in a moral village of the Metropolitan District, a clergyman wrote thus: "I have been a pastor nearly two years, and during that time have officiated at several weddings. I have

the Bureau of Vital Statistics (301 Mott street, New York,) immediately after the ceremony has been solemnized, and that in every town in Kings county,—as well as in the city of Brooklyn,—the marriage returns shall be rendered to this Bureau at the *Bureau's* office,—of which Dr. R. CARSON STILES is the local Registrar.

The important influence which these needful legal forms exert upon the social and moral welfare of society will be conceded by all who investigate or seriously reflect upon the subject. And in addition to its wholesome influence in a general way upon society, its direct and individual results are vitally important and very far-reaching: for the faithful registry of the facts called for in this Marriage Certificate and Record may, in any case, prove beneficial, not only to the persons who have entered into the marriage contract thus registered, but to their children, the protection of whose interests, in regard both to social status and *Asiatic*, is one of the chief objects of such registration.

The Board of Health has adopted measures for insuring the highest degree of accuracy and thoroughness in its registration of Marriages, Births and Deaths. And it appeals to you for your influence as well as your example in securing prompt and scrupulously exact reports for the required registration.

Believing that every clergyman and magistrate, who reflects upon the importance of this registration, will desire to do all in his power to render implicit obedience to the requirements of the law, the Board of Health invites attention to the precise words of the statutes. (An abstract of these laws has been carefully collated by the legal counselor of the Board, and is herewith placed in your hands.)

By the great majority of clergymen and magistrates certified returns for registration are promptly and voluntarily rendered: But the law provides penalties for inattention to its requirements. In the 13th section of the Health Act (Chapter 74, Laws of 1863,) the following duties are enjoined:

"And for every omission of any person to make and keep the registry required by the acts referred to in this section, and for every omission to report a written copy of the same to said Board within ten days after any Birth or Marriage provided to be registered, any person guilty of such omission shall be liable to pay a fine of ten dollars, which may be sued for and recovered in the name of said Board."

This law secures the preservation in duplicate of the Marriage Record. The blank forms which are supplied to clergymen and magistrates by this Bureau are prepared in duplicate, and so arranged in a stitched book as to enable the person officiating to return the *certified* copy while he retains the other in a permanent register.

With furnishing to the married couple a transcript of the certificate, this Bureau has nothing to do, except when questions of legal or historical importance arise. But among the daily applicants for copies of the public records, in this Bureau, there are numerous instances in which the fact appears that the person who solemnized the marriage gave no Certificate to the persons he married; and in view of this fact and the importance of such *certified evidence*, in the hands of a wife or widow, it seems highly desirable that a copy of the Marriage Certificate should be given to the couple at the time of the ceremony. Scrupulous care and accuracy should be observed in writing the names of the persons married, and of every name that is included in the record.

In order to possess the means of aiding clergymen and others in discovering and correcting any error or deficiency in the marriage returns due from each clergyman and magistrate, an account current is kept in this Bureau and is footed up monthly, of the dates and numbers of the marriage returns that each gentleman forwards for the public registration. And it is respectfully suggested that a comparison of these monthly totals should

never recorded a marriage. I have no knowledge of a law requiring such a record. Will you please publish so much of the law as specifies the duties of pastors concerning marriages?"

Of course, it would be unjust to expect obedience to a law from persons who are not aware of its existence. But is it too much to expect those who aid their parishioners—and all others who may call upon them—to

be made semi-annually or oftener, for the purpose of correcting any error or deficiency that may occur from loss by mail or otherwise.

The correspondence relating to Marriage returns, for Kings county, should be addressed to Dr. R. CASSON STILLS, Deputy Registrar of the Bureau of Vital Statistics, Court House, Brooklyn; and for the counties of New York, Westchester, Richmond and Queens, to Mr. JOHN BOWNE, Chief Clerk, Bureau of Vital Statistics, 301 Mott street, New York.

On behalf of the Board of Health,

Respectfully, your obedient servant,

ELISHA HARRIS,

Registrar Metropolitan Board of Health.

LAWS CONCERNING MARRIAGE.

In order to meet requests often made for a concise statement of the Laws of the State of New York relating to the duties of persons authorized to solemnize marriage, the following summary of the law upon this subject has been carefully revised by the legal counselor of the Metropolitan Board of Health:

I.—What persons are authorized to solemnize Marriages, and to certify such solemnization?

- (1.) Ministers of the Gospel, and Priests of every denomination.
- (2.) Mayors, Recorders and Aldermen of cities.
- (3.) Judges of County Courts and Justices of the Peace.
- (4.) Jews, and also those designated in the statute as Quakers (Friends), are authorized to solemnize marriage in the manner and agreeably to the regulations of their respective societies.
- (5.) The right and privilege of registry and authentication of a marriage under the statute is made dependent on its being solemnized by one of the officers, ministers or priests, or in the manner above referred to.

II.—Marriage is forbidden between what persons?

- (1.) Between parents and children; grand-parents and grand-children of every degree; brothers and sisters, as well the half as of the whole blood relations; and all such marriages are incestuous and void. And those prohibitions extend to illegitimate as well as to legitimate children.
- (2.) Between persons when either of the parties to a marriage shall be incapable, for want of age or understanding, or incapable from physical causes, of entering into the marriage state; or when the consent of either party shall have been obtained by force or fraud.
- (3.) Marriage is forbidden to any person during the life-time of any former husband or wife of such person, unless (1) the marriage with such former husband or wife shall have been annulled or dissolved for some other cause than the adultery of the said person; or (2) unless such former husband or wife shall have been finally sentenced to imprisonment for life.
- (4.) Males under fourteen and females under twelve years of age are incapable of consenting to marriage; and the Courts may divorce females married under fourteen, without the consent of parents or guardians, if the marriage has not been ratified, and there has not been cohabitation since arriving at fourteen years of age.
- (5.) Persons authorized to perform the marriage ceremony are liable to be punished by fine or imprisonment, if with knowledge they solemnize the ceremony between parties, either of which is under the age of consent, an idiot or lunatic, or as to which there is a legal impediment existing.

enter that socially sacred relation, which is legalized by marriage and sanctified by the rites of the church, to be so fully informed of the importance, to society and the State, of the contracts they make and solemnize, that they shall at least acquaint themselves with the nature of the duties they so heedlessly assume? And would it not be wise in those who are about to enter into the marriage relation, to select only such clergymen as

III.—What is required of the Clergyman, Magistrate, or other person who solemnizes Marriage, as regards the ceremonials?

When solemnized by a minister or priest, the ceremony of marriage shall be according to the forms and customs of the church or society to which he belongs. When solemnized by a magistrate no particular form shall be required, except that the parties shall solemnly declare, in the presence of the magistrate and the attending witness or witnesses, that they take each other as husband and wife. In every case there shall be at least one witness, beside the minister or magistrate, present at the ceremony.

IV.—What is required as regards the official duty towards the persons about to be married?

It shall be the duty of every minister, priest or magistrate required to solemnize a marriage to ascertain—

(1.) The Christian and surnames of the parties; their respective places of residence, and that they are of sufficient age to be capable in law of contracting marriage.

(2.) The names and places of residence of two of the attesting witnesses, if more than one be present, and if not, the name and place of residence of such witness. He shall enter the facts so ascertained, and the day on which such marriage is solemnized, in a book to be kept by him for that purpose.

If either of the parties between whom the marriage is to be solemnized shall not be personally known to him, the minister or magistrate shall ascertain to his satisfaction the identity of the respective parties.

The right of husband and wife to demand and receive a certificate of their Marriage at the hands of the Minister or Magistrate; what such certificate shall contain.

[This certificate is independent of the one returned to the Bureau of Vital Statistics.]

Whenever a marriage shall have been solemnized within this State, pursuant to this title, the minister or magistrate by whom the marriage was solemnized shall furnish, on request, to either party, a certificate thereof, specifying—

(1.) The names and places of residence of the parties married, and that they were known to such minister or magistrate, or were satisfactorily proved by the oath of a person known to him to be the persons described in such certificate, and that he had ascertained that they were of sufficient age to contract marriage.

(2.) The name and place of residence of the attesting witness or witnesses, and—

(3.) The certificate shall also state that after due inquiry made, there appeared no lawful impediment to such marriage; and it shall be signed by the person making it.

V.—What is required in regard to the certified returns to be rendered to the Bureau of Vital Statistics of the Board of Health?

(1.) One copy of a duplicate record that has been made out in accordance with the forms provided by that Bureau shall be forwarded to the Registrar of Vital Statistics of said Board within five days of the marriage, and by such means as will insure its reception, by mail or by hand, in less than ten days after the marriage.

(2.) The person who solemnizes the marriage must keep a perfect duplicate of the copy of record which has been forwarded to the Registrar of the Board of Health.

(3.) All names of persons must be accurately spelled and distinctly written.

The foregoing summary, comprising the chief points upon which general information, especially by clergymen and magistrates, is often desired, is respectfully submitted to all persons concerned in the solemnization of the marriage ceremonies in the Metropolitan District.

are known to secure to the couples they marry all the rights and privileges accorded them by the State? In view of the past experience of the Bureau there can be no doubt that much pain, time and money would be often saved by such forethought, while not infrequently reputations would be protected and lives brightened, and homes made happy, by such an exercise of prudence on the part of the parents, friends and guardians of the persons about to marry. As it is, and until some plan shall have been adopted which will absolutely compel obedience, there can be little doubt that the marriage registration will always be deficient. No other way seems now open, save to continue the means that have produced the excellent and unexpected results herein set forth; but it is more than probable, although the fact must be greatly regretted, that the present efforts to secure returns have reached their maximum of success. It is, however, altogether likely that the methods alluded to, may, by persistent application, prevent these returns from falling below their present standard of exactness and completeness; but if this should prove to be the result it will be all that can reasonably be expected, unless some more efficient plan can be devised to extend the knowledge of the social value of marriage registration, and to more deeply impress those who are required by law to forward marriage returns with the duty they owe to themselves, to the couples they marry and to the State.

JOHN BOWNE,

Chief Clerk, Bureau Vital Statistics.

The facts which Mr. Bowne here presents are worthy of the most thoughtful attention. The efforts which he has put forth to render every individual record of marriage as perfect as possible have been worthily crowned by a degree of success that can scarcely be exceeded. And in the course of the daily duties in this branch of the Bureau of Vital Statistics the revelations of social disgrace, anxiety and woe, the history of gross wrongs and of culpable neglect in the matter of marriage registration, have been such as to warrant even stronger expressions than have here been employed by this most faithful and intelligent gentleman.

As respects the cost and trouble of registration of marriages in the very complete manner which is required under the Metropolitan Board of Health, we need only mention the fact that in a single and not unusual case of bigamy recently litigated in the courts of England, relating to a marriage that was solemnized in a fashionable circle in the city of New York, more money was expended upon questions of evidence than has been expended by this Board for the registration of the marriage of upwards of 3,500 persons. And it is safe to presume that in the State of New York more than twenty times the amount of money which would be requisite for securing the complete registration of marriage in every town is yearly expended or lost in legal suits and wrongs which result from absence of registration.

* A list of clergymen and magistrates who made returns to the Bureau of Vital Statistics during the year 1888, together with the number of marriages returned by each one, will be found in the Appendix to the Bureau's report—Appended Statement No. III.

REGISTRATION OF BIRTHS DURING THE YEAR.

There were 12,672 births registered during the year ending September 30th. As in marriage registration, so in the registration of births, we find it expedient to close the records for the year at the end of the summer quarter, so as to present the perfected returns of the preceding four quarters or twelve months for the requisite revision of the original vouchers and the public registers. This practice is followed in regard to marriage registration by the English and Prussian registrars.

It will be observed that the greatest number of birth certificates were returned in the month of September (1,156), and the least number in April (925). Also, that the summer quarter had the highest birth-rate, its total returns amounting to 3,367 in New York and 1,195 in Brooklyn, while the spring quarter of the year gave the least number, its returns amounting to 2,880 in New York and 1,139 in Brooklyn. The accompanying abstracts presents the only analysis of the birth records that seems important in this year's report :

Abstract of the Registry of Births in the City of New York, in the twelve months ending September 30th, 1868.

MONTHS.	TOTAL.	COLOR.		SEX.	NATIVITY OF PARENTS.										NAME OF CHILD.				
		White.	Colored.		Not stated.	Male.	Female.	Not stated.	Foreign.	Native.	Foreign birth or only.	Foreign moth or only.	Nativ. of father that stated only.				Not stated.	Stated.	Not stated.
													Native.	Foreign.	Native.	Foreign.			
October	1,067	1,075	12	....	584	503	211	78	56	....	....	2	40	1	740	347	
November	1,084	1,025	9	....	522	512	176	97	50	1	1	1	37	1	685	349		
December	1,017	1,010	7	....	531	486	171	85	61	....	....	1	39	4	657	360	
Total quarter end'g Dec., '67	3,138	3,110	28	....	1,637	1,501	558	260	167	1	1	5	116	6	2,082	1,056		
January	1,105	1,096	8	1	566	539	173	89	33	1	....	10	53	5	711	394		
February	1,141	1,130	11	....	619	522	196	95	38	....	2	8	45	6	705	433	
March	1,091	1,080	11	....	563	521	203	102	100	1	1	3	2	....	680	411	
Total quarter end'g Mar., '68	3,337	3,306	30	1	1,753	1,582	572	286	171	2	3	21	100	11	2,096	1,241			
April	925	917	8	....	430	505	159	67	36	....	3	6	39	6	630	295	
May	930	921	9	....	469	461	156	66	37	....	1	2	56	1	642	288	
June	975	971	4	....	471	503	173	74	38	....	1	6	53	4	690	285	
Total quarter end'g June, '68	2,830	2,809	21	....	1,360	1,469	488	207	111	....	5	14	148	11	1,962	863	
July	1,134	1,127	7	....	559	575	140	74	45	....	1	8	64	....	790	344	
August	1,077	1,068	9	....	609	467	202	73	43	....	....	6	51	1	701	376	
September	1,156	1,144	12	....	613	542	209	89	41	....	....	3	33	3	796	369	
Total quarter end'g Sept., '68	3,367	3,339	28	....	1,781	1,694	551	286	129	....	1	17	149	4	2,287	1,089	
Total in the twelve months..	12,672	12,564	107	1	6,531	6,136	2,169	1,117	578	3	10	57	512	32	8,427	4,245			

Hitherto all the certified returns of births have been voluntary, and, of course, chiefly by reputable physicians and midwives. The Board has not yet attempted to bring in the uncertified records which can only be obtained by house-to-house inquiry. But it should be publicly shown that such inquiry is an indispensable means for obtaining this large amount of information that is required by the public registers concerning the natural increase of population. The social, economical and moral interests of society demand that this branch of the vital registration shall be rendered complete year by year by one or two thorough canvasses of the families of the city. The facts upon this subject were fully set forth in last year's report. Boston and Providence, the only two cities in America that have really complete registration of births, have demonstrated in a business-like way how practicable it is to make these house-to-house inquiries, and we may mention that one of the results of the correspondence of the Bureau with the officers who direct the registration in Boston was a spontaneous offer of service to make the canvass for the completion of the birth-records twice yearly, as a matter of business, by the same firm of directory canvassers that makes returns to the Vital Registrar in that city. There is every reason to believe that the Board of Health can, by the aid of a specially instructed class of policemen, attain the desired completeness of birth returns throughout the cities and villages of the district. This work should be thorough and effectual, for these records of birth, like those of marriage, are "the poor man's charter."

An American statistician has justly remarked "it would be impossible for a large portion of the adult men and women born in the United States to prove by any public records or other legal documents that they were legitimate offspring with a natural right to the name they bear, or even that their parents were ever married."

In submitting to the Board of Health these annual records of birth and marriage the Registrar expresses his sincere regret that he has had no power to gather in the residue of returns which should be placed upon the public registers, nor even to procure by circular the more complete returns from physicians. He respectfully urges that suitable efforts be put forth to secure more imperative and simple laws for obtaining the proper certified returns from physicians and midwives, which shall at the same time make the duty of perfecting this class of returns obligatory upon the authorities or officers whom the State makes the custodians of the local registers and certified vouchers of births.

There is reason to believe that only about *fifty per centum* of the mothers in New York and Brooklyn are attended in accouchment by physicians and educated obstetricians. The other half only have the attendance of the commonest midwives or nurses. We have reason to believe that the total number of births registered during the year is equal to about *thirty-five per centum* of the total number born, or 30 out of every 100 of the births attended by physicians go uncertified and unregistered. This neglect is not

to be countenanced, but the neglects by old dames and nurses is not strange, and it can only be reached by house-to-house visitation.

Lest the Malthusen philosophers, or the too hasty students of this class of statistics, should quote these partial returns, of only 35 per centum of the actual, as being the full tally, and so rush to alarming conclusions concerning the social tendencies to childlessness, and the waning of the divinely-appointed functions of maternity, we would repeat in this place the same compact argument of the numerical count upon this subject, as given in our second annual report. The sad loss of 8,157 infant lives before their first birthday in New York, and 3,001 in Brooklyn the past year, clearly enough confirms all that is taught in the following abstract from census and mortality returns.

The Number of Births that occurred in New York during the Five Years ending 1865, shown by the Records of Death and the Census of Living Children under Five Years of Age—all having been born in the period mentioned.

AGES OF INFANTS THAT DIED.	YEARS.					Total.
	1860.	1861.	1862.	1863.	1864.	
Deaths under one year.....	6,087	6,189	5,720	5,118	6,058	30,172
Deaths from one to two years.....		2,990	2,937	3,481	3,261	12,649
Deaths from two to three years.....			1,200	1,603	1,484	4,286
Deaths from three to four years.....				971	997	1,968
Deaths from four to five years.....					627	627
Yearly totals and the grand total of the deaths of children born in that quinquenniad	6,087	9,179	9,857	12,153	12,427	49,703
Total number of children under five years of age, living at the beginning of 1865						95,032
Total number of children (living and dead) that were born during those five years						144,734
Average number of births each year of the quinquenniad.....						28,944

Doubtless the arts of the ghoul-like destroyers of foetal life are enriching their purses and pampering the most perilous sins; for almost every county in New York and each of the adjacent States sends some frail woman yearly to the Metropolis to lose her life, while many more lose health and womanly nobility at the hands of these murderers of unborn infants. But a clear majority of the mothers whose homes are cheered by the voices of children are trained in the Catholic church, which teaches, as all religious teachers should, that it is a mortal sin to destroy infant life.

For a commercial city, with a vast population of homeless men, New York unquestionably has a high birth-rate, viz., not less than 32,000 or 33,000 births yearly to the 1,000,000 of inhabitants. We would refer to our second report for facts upon this subject.

STILL-BIRTHS.

The very strict regulations concerning the burial of the dead in New York and Brooklyn enable the Board of Health to make more complete registration of the dead-born infants than has been effected elsewhere in the cities in this country and Europe with which we hold correspondence. Scarcely any of the still-born infants that had reached a viable period of utero-gestation escape registration in this Bureau, and, indeed, no blighted birth that in its foetal state passed the period of "quickening" escapes the proper registration, unless the parents and medical attendants connive at the sequestration of the dead infant. As this registration is not for the common inspection of the public, but is especially a social and hygienic safeguard, required in the interests of good order and a suitable regard for family honor and respect for the sacred attributes of human life, we are not authorized to give more than the following statistical facts relating to those infants that never breathed.

Abstract of Still Births in the City of New York, for the Twelve Months ending December 31st, 1868.

MONTHS.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
	203	210	183	185	191	181	178	179	173	165	152	195	2,195

These 2,195 still-births amount to 8.82 per cent of the total number of the deaths that occurred in the living population of New York.* This percentage of still-births to the total mortality, and to population and the living birth-rate is truly enormous. Its causes are worthy of physiological

* In Italy 14,209 still-births (*mort nés*) were registered, out of an aggregate of 845,454 births, in 1864; and of these 8,269 were males, and 5,940 females. The two sexes were still born in the proportion of 138 males to 100 females. To 100 births the number of the legitimate still-born is 1.85; of illegitimates, 6.59; of children found exposed, 2.61, and for all lists of children, 1.94, which, with the exception of Austria, is the lowest proportion of still-born to total births in any European state. In the Netherlands the still-birth ratio is 5.64 per cent; in Belgium, 4.72 per cent; in France, 4.63 per cent; in Saxony, 4.49; per cent; in Norway, 4.46 per cent; in Prussia, 4.33 per cent; in Hanover, 4 per cent; in Bavaria, 3.74 per cent, and in Austria, 1.64 per cent.

It must be borne in mind that in none of the countries here mentioned do the sanitary authorities have so complete control over the disposal of the dead-born. It is impossible, therefore, that some fractional part of this very excessive ratio of dead-births, as compared with this ratio of this class of deaths in other countries, is to be accounted for from this circumstance concerning the surveillance over the interment of the dead. It is to be feared that the true causes of this fearful excess, however, are to be found mainly in the culpable neglect and ignorance of midwives and a low class of nurses that are the obstetrical attendants and pernicious advisers of the low class of mothers who do not enjoy the benefits of attendance by educated physicians. The ratio of still-births in the Netherlands, as given in returns of the state, is probably as near the normal rate as in any civilized country. Compared with that rate the still-birth ratio in the city of New York is nearly double any normal and justifiable ratio.

and medical inquiry ; and the records which the Board of Health requires concerning this class of deaths will eventually be valuable. They are accessible to scientific physicians. The subjoined schedule presents the points that are required in this branch of vital registration :

RETURN OF A STILL-BIRTH.

*To the Bureau of Vital Statistics,
Metropolitan Board of Health, 301 Mott St., New York :*

[The death of an infant that has breathed must not be returned as a *still-birth*; such deaths should be certified in the usual manner, after returning the birth-record.]

Name of Mother, _____
 Name of Father, _____
 Residence of Mother, _____
 Period of Utero-gestation, _____
 Date of this Birth, _____
 Sex, _____ Color, _____
 Number of Child of Mother, _____
 Nativity of Mother, _____ of Father, _____
 Cause of Dead-birth (if known), _____
 Name of Medical Attendant, _____
 Residence of Medical Attendant, _____
 Name of person making this Return, _____
 Residence do _____
 Date of this Return, _____ 186 .
 Undertaker, _____
 Place of Burial, _____

In Great Britain and all other countries in which the sexton and the parish priest are authorized to make up the certificates and individual returns of deaths, no records of still-births are registered. It seems proper, therefore, in this place, to mention the fact that the records in this almost universally neglected branch of Vital Statistics are full of importance, and of medical and hygienic significance. We would respectfully urge upon all sanitary authorities and vital statistis the duty of establishing such registration in every city and nation.

INFANTICIDE AND FETICIDE.

The most secret, demoralizing and hideous crime which now goes unpunished by the laws of the State is, unquestionably, that of infanticide in its masked and abhorrent form of feticide. The exalted and most ennobling attribute of womanhood—the functions of legitimate maternity—are hideously degraded, and health of body and mind are sacrificed in thousands of instances every year in the State of New York. No words can depict the actual extent and consequences of this crime against nature. It is a subject so relevant to public health and to the rights of human life that the time must come when all persons who openly aid or encourage women in this vice shall receive the penalties that are due to the destroyers of human lives and social order. The detailed information which is accumulated in regard to this subject cannot be published in our reports. The State will continue to enlarge its asylums for insane women, and fight in vain against a long train of social evils, if the people are to continue unguarded against that most hideous of criminals—the abortionist.*

THE CONSOLIDATED ABSTRACTS OF THE CAUSES OF DEATH.

The forms adopted by us in the two previous reports are continued this year. They are designed to present—

- (1.) The names of the causes of death as they stand upon the pages of the public registers.
- (2.) The grouping of these statistics into classes and orders, in conformity to the general plan of Dr. Wm. Farr, which was adopted by the International Statistical Conference at Paris in 1867.
- (3.) The statistical distribution of these records in detail, and by sexes and by *order and class* summaries, in twenty quinquennial (five years) periods that comprehend the widest range of longevity; also the share that each of the first five years of childhood has in the death-rate.
- (4.) The percentage estimation of each cause, class, order and age, in its respective relations to the total mortality in the year.
- (5.) The recapitulation of the total mortality, in classes of causes, together with the respective percentages on the total amount.
- (6.) A comparative view of the respective total summaries of classes of causes, and the ages in three successive years 1866, 1867, 1868.
- (7.) Finally, a diagrammatic illustration of the comparative view of the past three years' experience in New York and Brooklyn.

* The annual report of Dr. Gray, the Superintendent of the New York State Lunatic Asylum at Utica, for 1867, presents important facts on this subject.

Consolidated Abstracts of Deaths in New York, from all Causes, Registered for the Twelve Months ending December 31st, 1868.

MALES.

CAUSES OF DEATH.	NATIVITY.		Colored.	Under 1 yr.	1-2	2-3	4	Total under 5 years.	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	100 and up-wards.	Total Males.
	United States.	Foreign.																										
CLASS I.—ZYMOTIC DISEASES.																												
ORDER 1. (MIASMATIC DISEASES.)																												
Small Pox.....	6	8	.....	3	.....	2	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14
Varicoid.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Measles.....	87	11	.....	38	31	11	8	4	92	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98
Scarlatina.....	388	29	1	34	73	99	61	40	307	95	8	3	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	417
Diphtheria.....	133	15	1	38	33	21	14	15	121	18	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	148
Quincy (Tonsillitis).....	8	2	.....	1	2	2	1	1	7	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10
Croup (Membranous).....	169	10	2	35	54	39	27	9	164	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	179
Whooping-Cough.....	89	24	.....	53	27	5	2	1	88	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89
Typhus Fever.....	24	62	.....	1	3	3	1	.....	8	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86
Typhoid Fever.....	58	123	3	.....	.....	.....	.....	.....	12	21	10	15	32	24	15	14	4	10	5	6	5	6	1	.....	.....	.....	.....	181
Erysipelas.....	37	16	.....	25	1	1	.....	.....	28	1	1	2	3	1	2	3	1	3	6	1	.....	.....	.....	.....	.....	.....	.....	63
Carbuncle.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Dysentery.....	134	96	1	63	35	8	9	4	119	6	2	5	8	13	10	9	7	5	6	5	1	3	.....	.....	.....	.....	.....	339
Diarrhoea.....	436	127	2	310	110	19	16	4	459	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	563
Cholera Morbus.....	10	21	.....	4	1	.....	.....	.....	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31
Cholera.....	1	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Cholera Infantum.....	912	5	6	609	275	29	2	.....	915	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	917
Enterocolitis.....	211	2	.....	196	15	1	1	.....	213	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	213
Carabro-Spinal Meningitis.....	16	3	.....	5	4	1	2	.....	12	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19
Intermittent Fever.....	6	7	.....	1	.....	.....	.....	.....	1	1	1	1	3	1	1	1	1	1	1	1	1	.....	.....	.....	.....	.....	.....	13
Remittent Fever.....	34	28	2	4	3	4	3	3	16	5	3	3	3	6	2	1	2	5	5	1	.....	.....	.....	.....	.....	.....	.....	63
Yellow Fever.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Pyæmia.....	13	32	.....	2	.....	.....	.....	.....	3	3	3	6	9	4	5	3	1	2	1	.....	.....	.....	.....	.....	.....	.....	.....	45
Septicæmia.....	3	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
Total Miasmatic Diseases.....	2,777	698	18	1,433	670	246	152	87	2,578	101	35	40	76	99	57	40	54	41	27	23	39	12	11	7	.....	.....	.....	3,385

CAUSES OF DEATH.	FEMALES.																												Total both Sexes.	Percentage of each Cause on Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	NATIVITY.		Colored.	Under 1 year																		Total under 5 years.	10-15.	15-20.	20-25.	25-30.	30-35.	35-40.			40-45.	45-50.	50-55.	55-60.	60-65.	65-70.	70-75.	75-80.	80-85.	85-90.	90-95.	95-100 and up.	Total Female.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	United States.	Foreign.		1-11 months.	1-12 months.	1-18 months.	18 months-2 years.	2-3 years.	3-4 years.	4-5 years.	5-6 years.	6-7 years.	7-8 years.	8-9 years.	9-10 years.	10-11 years.	11-12 years.	12-13 years.	13-14 years.	14-15 years.	15-16 years.																							16-17 years.	17-18 years.	18-19 years.	19-20 years.	20-21 years.	21-22 years.	22-23 years.	23-24 years.	24-25 years.	25-26 years.	26-27 years.	27-28 years.	28-29 years.	29-30 years.	30-31 years.	31-32 years.	32-33 years.	33-34 years.	34-35 years.	35-36 years.	36-37 years.	37-38 years.	38-39 years.	39-40 years.	40-41 years.	41-42 years.	42-43 years.	43-44 years.	44-45 years.	45-46 years.	46-47 years.	47-48 years.	48-49 years.	49-50 years.	50-51 years.	51-52 years.	52-53 years.	53-54 years.	54-55 years.	55-56 years.	56-57 years.	57-58 years.	58-59 years.	59-60 years.	60-61 years.	61-62 years.	62-63 years.	63-64 years.	64-65 years.	65-66 years.	66-67 years.	67-68 years.	68-69 years.	69-70 years.	70-71 years.	71-72 years.	72-73 years.	73-74 years.	74-75 years.	75-76 years.	76-77 years.	77-78 years.	78-79 years.	79-80 years.	80-81 years.	81-82 years.	82-83 years.	83-84 years.	84-85 years.	85-86 years.	86-87 years.	87-88 years.	88-89 years.	89-90 years.	90-91 years.	91-92 years.	92-93 years.	93-94 years.	94-95 years.	95-96 years.	96-97 years.	97-98 years.	98-99 years.	99-100 years.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
CLASS 1.—Continued.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
ORDER 2. (ESTHETIC OR INOCULATED DISEASES.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Syphilis	32	1	1	30	2	32

Consolidated Abstracts of Deaths in New York, from all Causes, Registered for the Twelve Months ending December 31st, 1868.

MALES.

CAUSES OF DEATH.	NATIVITY.		Colored.	Under 1 yr.	1-	2-	3-	4-	Total under 5 years.	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	100 and up-wards.	Total Males.		
	United States.	Foreign.																													
CLASS I.—ZYMOTIC DISEASES.																															
ORDER I. (MIASMATIC DISEASES.)																															
Small Pox	6	8	.....	3	.....	2	2	1	8	.....	1	1	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	
Varicoid	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98
Measles	87	11	1	39	31	11	8	4	92	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	417
Scarlatina	388	20	1	24	73	99	61	40	307	95	8	3	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	148
Diphtheria	133	15	1	39	33	21	14	13	121	18	2	1	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10
Quinsy (Tonsillitis)	8	2	.....	1	2	2	1	1	7	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	179
Croup (Membranous)	169	10	2	35	54	59	27	9	164	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89
Whooping-Cough	89	.....	.....	53	27	5	2	1	88	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86
Typhus Fever	24	62	.....	1	3	3	1	.....	8	4	5	10	15	5	7	9	2	4	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	181
Typhoid Fever	58	123	3	.....	3	1	4	4	12	21	10	15	32	24	15	14	4	10	5	6	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	53
Erysipelas	37	16	.....	25	1	1	.....	1	28	1	1	2	1	2	3	1	3	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Carbuncle	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	230
Dysentery	134	66	1	63	35	8	9	4	119	6	2	5	8	13	10	9	7	5	6	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	563
Diarrhoea	436	127	2	310	110	19	16	4	459	8	2	3	3	9	7	8	11	14	4	10	12	7	2	1	.....	.....	.....	.....	.....	.....	31
Cholera Morbus	10	21	.....	4	1	.....	.....	.....	5	1	3	.....	2	2	3	3	2	1	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Cholera	1	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31
Cholera Infantum	912	5	6	609	275	20	2	.....	915	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	917
Enterocolitis	211	2	1	196	15	1	1	.....	213	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	213
Cerebro-Spinal Meningitis	16	3	.....	5	4	1	2	.....	12	3	1	1	1	1	1	1	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19
Intermittent Fever	6	7	.....	1	1	1	1	.....	1	1	1	1	1	1	1	1	1	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13
Remittent Fever	34	28	2	4	3	4	2	3	10	5	3	3	3	6	5	2	2	5	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62
Yellow Fever .....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Pyæmia	13	32	.....	2	.....	.....	.....	.....	2	3	3	3	6	9	4	5	2	3	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45
Septicæmia	3	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
Total Miasmatic Diseases	3,777	608	18	1,423	670	246	152	67	2,678	191	35	40	75	70	69	67	10	34	11	27	32	19	11	7	1	.....	.....	.....	.....	.....	3,386

CAUSES OF DEATH.										FEMALES.																			Total both Sexes.	Percentage of each Cause on Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
NATIVITY.		Colored.	Under 1 year.	1- 10 years.	11- 20 years.	21- 30 years.	31- 40 years.	41- 50 years.	51- 60 years.	61- 70 years.	71- 80 years.	81- 90 years.	91- 100 years.	Total upwards 100 and over.	Total Females.	Total Males.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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ORDER I. (DIATHETIC DISEASES.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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CAUSES OF DEATH.	FEMALES.																				Total both Sexes.	Percentage of each cause on Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	NATIVITY.		Colored.	Under 1 year.	1.	2.	3.	4.	Total under 5 years.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.			16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.	44.	45.	46.	47.	48.	49.	50.	51.	52.	53.	54.	55.	56.	57.	58.	59.	60.	61.	62.	63.	64.	65.	66.	67.	68.	69.	70.	71.	72.	73.	74.	75.	76.	77.	78.	79.	80.	81.	82.	83.	84.	85.	86.	87.	88.	89.	90.	91.	92.	93.	94.	95.	96.	97.	98.	99.	100.	101.	102.	103.	104.	105.	106.	107.	108.	109.	110.	111.	112.	113.	114.	115.	116.	117.	118.	119.	120.	121.	122.	123.	124.	125.	126.	127.	128.	129.	130.	131.	132.	133.	134.	135.	136.	137.	138.	139.	140.	141.	142.	143.	144.	145.	146.	147.	148.	149.	150.	151.	152.	153.	154.	155.	156.	157.	158.	159.	160.	161.	162.	163.	164.	165.	166.	167.	168.	169.	170.	171.	172.	173.	174.	175.	176.	177.	178.	179.	180.	181.	182.	183.	184.	185.	186.	187.	188.	189.	190.	191.	192.	193.	194.	195.	196.	197.	198.	199.	200.	201.	202.	203.	204.	205.	206.	207.	208.	209.	210.	211.	212.	213.	214.	215.	216.	217.	218.	219.	220.	221.	222.	223.	224.	225.	226.	227.	228.	229.	230.	231.	232.	233.	234.	235.	236.	237.	238.	239.	240.	241.	242.	243.	244.	245.	246.	247.	248.	249.	250.	251.	252.	253.	254.	255.	256.	257.	258.	259.	260.	261.	262.	263.	264.	265.	266.	267.	268.	269.	270.	271.	272.	273.	274.	275.	276.	277.	278.	279.	280.	281.	282.	283.	284.	285.	286.	287.	288.	289.	290.	291.	292.	293.	294.	295.	296.	297.	298.	299.	300.	301.	302.	303.	304.	305.	306.	307.	308.	309.	310.	311.	312.	313.	314.	315.	316.	317.	318.	319.	320.	321.	322.	323.	324.	325.	326.	327.	328.	329.	330.	331.	332.	333.	334.	335.	336.	337.	338.	339.	340.	341.	342.	343.	344.	345.	346.	347.	348.	349.	350.	351.	352.	353.	354.	355.	356.	357.	358.	359.	360.	361.	362.	363.	364.	365.	366.	367.	368.	369.	370.	371.	372.	373.	374.	375.	376.	377.	378.	379.	380.	381.	382.	383.	384.	385.	386.	387.	388.	389.	390.	391.	392.	393.	394.	395.	396.	397.	398.	399.	400.	401.	402.	403.	404.	405.	406.	407.	408.	409.	410.	411.	412.	413.	414.	415.	416.	417.	418.	419.	420.	421.	422.	423.	424.	425.	426.	427.	428.	429.	430.	431.	432.	433.	434.	435.	436.	437.	438.	439.	440.	441.	442.	443.	444.	445.	446.	447.	448.	449.	450.	451.	452.	453.	454.	455.	456.	457.	458.	459.	460.	461.	462.	463.	464.	465.	466.	467.	468.	469.	470.	471.	472.	473.	474.	475.	476.	477.	478.	479.	480.	481.	482.	483.	484.	485.	486.	487.	488.	489.	490.	491.	492.	493.	494.	495.	496.	497.	498.	499.	500.	501.	502.	503.	504.	505.	506.	507.	508.	509.	510.	511.	512.	513.	514.	515.	516.	517.	518.	519.	520.	521.	522.	523.	524.	525.	526.	527.	528.	529.	530.	531.	532.	533.	534.	535.	536.	537.	538.	539.	540.	541.	542.	543.	544.	545.	546.	547.	548.	549.	550.	551.	552.	553.	554.	555.	556.	557.	558.	559.	560.	561.	562.	563.	564.	565.	566.	567.	568.	569.	570.	571.	572.	573.	574.	575.	576.	577.	578.	579.	580.	581.	582.	583.	584.	585.	586.	587.	588.	589.	590.	591.	592.	593.	594.	595.	596.	597.	598.	599.	600.	601.	602.	603.	604.	605.	606.	607.	608.	609.	610.	611.	612.	613.	614.	615.	616.	617.	618.	619.	620.	621.	622.	623.	624.	625.	626.	627.	628.	629.	630.	631.	632.	633.	634.	635.	636.	637.	638.	639.	640.	641.	642.	643.	644.	645.	646.	647.	648.	649.	650.	651.	652.	653.	654.	655.	656.	657.	658.	659.	660.	661.	662.	663.	664.	665.	666.	667.	668.	669.	670.	671.	672.	673.	674.	675.	676.	677.	678.	679.	680.	681.	682.	683.	684.	685.	686.	687.	688.	689.	690.	691.	692.	693.	694.	695.	696.	697.	698.	699.	700.	701.	702.	703.	704.	705.	706.	707.	708.	709.	710.	711.	712.	713.	714.	715.	716.	717.	718.	719.	720.	721.	722.	723.	724.	725.	726.	727.	728.	729.	730.	731.	732.	733.	734.	735.	736.	737.	738.	739.	740.	741.	742.	743.	744.	745.	746.	747.	748.	749.	750.	751.	752.	753.	754.	755.	756.	757.	758.	759.	760.	761.	762.	763.	764.	765.	766.	767.	768.	769.	770.	771.	772.	773.	774.	775.	776.	777.	778.	779.	780.	781.	782.	783.	784.	785.	786.	787.	788.	789.	790.	791.	792.	793.	794.	795.	796.	797.	798.	799.	800.	801.	802.	803.	804.	805.	806.	807.	808.	809.	810.	811.	812.	813.	814.	815.	816.	817.	818.	819.	820.	821.	822.	823.	824.	825.	826.	827.	828.	829.	830.	831.	832.	833.	834.	835.	836.	837.	838.	839.	840.	841.	842.	843.	844.	845.	846.	847.	848.	849.	850.	851.	852.	853.	854.	855.	856.	857.	858.	859.	860.	861.	862.	863.	864.	865.	866.	867.	868.	869.	870.	871.	872.	873.	874.	875.	876.	877.	878.	879.	880.	881.	882.	883.	884.	885.	886.	887.	888.	889.	890.	891.	892.	893.	894.	895.	896.	897.	898.	899.	900.	901.	902.	903.	904.	905.	906.	907.	908.	909.	910.	911.	912.	913.	914.	915.	916.	917.	918.	919.	920.	921.	922.	923.	924.	925.	926.	927.	928.	929.	930.	931.	932.	933.	934.	935.	936.	937.	938.	939.	940.	941.	942.	943.	944.	945.	946.	947.	948.	949.	950.	951.	952.	953.	954.	955.	956.	957.	958.	959.	960.	961.	962.	963.	964.	965.	966.	967.	968.	969.	970.	971.	972.	973.	974.	975.	976.	977.	978.	979.	980.	981.	982.	983.	984.	985.	986.	987.	988.	989.	990.	991.	992.	993.	994.	995.	996.	997.	998.	999.	1000.	1001.	1002.	1003.	1004.	1005.	1006.	1007.	1008.	1009.	1010.	1011.	1012.	1013.	1014.	1015.	1016.	1017.	1018.	1019.	1020.	1021.	1022.	1023.	1024.	1025.	1026.	1027.	1028.	1029.	1030.	1031.	1032.	1033.	1034.	1035.	1036.	1037.	1038.	1039.	1040.	1041.	1042.	1043.	1044.	1045.	1046.	1047.	1048.	1049.	1050.	1051.	1052.	1053.	1054.	1055.	1056.	1057.	1058.	1059.	1060.	1061.	1062.	1063.	1064.	1065.	1066.	1067.	1068.	1069.	1070.	1071.	1072.	1073.	1074.	1075.	1076.	1077.	1078.	1079.	1080.	1081.	1082.	1083.	1084.	1085.	1086.	1087.	1088.	1089.	1090.	1091.	1092.	1093.	1094.	1095.	1096.	1097.	1098.	1099.	1100.	1101.	1102.	1103.	1104.	1105.	1106.	1107.	1108.	1109.	1110.	1111.	1112.	1113.	1114.	1115.	1

Deaths in New York—Continued.

MALES.

CAUSES OF DEATH.	NATIVITY.		Colored.	Under 1 yr.	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90 and up.	Total Males.
	United States.	Foreign.													
CLASS III.—Continued.															
ORDER 4. (DIGESTIVE DISEASES.)															
Gastritis.....	51	18	2	27	1	4	1	1	3	2	1	4	2	1	69
Enteritis.....	124	25	1	80	21	5	...	...	...	...	...	...	...	...	149
Peritonitis.....	49	50	1	10	1	...	...	...	...	...	...	...	...	...	99
Colitis.....	9	13	1	2	1	1	1	1	4	1	1	1	1	1	22
Obstruction of Intestines.....	1	2	...	...	...	...	...	...	...	...	...	...	...	...	3
Narrowing of Intestines.....	2	1	...	1	...	...	...	...	...	...	...	...	...	...	3
Stricture of Intestines.....	6	10	3	2	...	...	...	...	...	...	...	...	...	...	10
Hernia (Strangulated).....	17	44	1	...	...	...	...	...	...	...	...	...	...	...	61
Cirrhosis of Liver.....	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Hepatitis (Culic).....	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2
Lead Colic.....	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2
Lead Disease.....	...	2	...	...	...	...	...	...	...	...	...	...	...	...	2
Intussusception.....	2	3	...	2	...	...	...	...	...	...	...	...	...	...	5
Fistula in Ano.....	1	1	...	...	...	...	...	...	...	...	...	...	...	...	2
Ulcer of the Stomach.....	6	5	...	1	...	...	...	...	...	...	...	...	...	...	11
Obstruction of Gall-Duct.....	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1
Hepatitis.....	12	35	1	...	...	...	...	...	...	...	...	...	...	...	47
Jaundice.....	18	4	...	12	1	...	...	...	...	...	...	...	...	...	23
Liver Disease.....	12	13	...	6	...	...	...	...	...	...	...	...	...	...	32
Anemia.....	1	2	...	1	...	...	...	...	...	...	...	...	...	...	3
Hematemesis.....	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1
Total Digestive Diseases.....	307	332	8	145	24	10	4	4	189	18	17	11	24	23	539

CAUSES OF DEATH.	FEMALES.																											Total both Sexes.	Percentage of each Cause on Total.					
	Nativity.		Colored.	Under 1 yr.	1	2	3	4	Total under 5 years.	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90			95	100 and up-wards.	Total Females.		
	United States.	Foreign.																																
CLASS III.—Continued.																																		
ORDER 4. (DIGESTIVE DISEASES.)																																		
Gastritis	55	20	3	22	4	1	1	3	6	5	5	7	3	6	1	2	4	...	...	...	...	...	...	...	...	...	...	...	...	...	84	153	.61	
Enteritis	120	40	1	67	16	9	2	2	93	3	3	5	4	6	4	7	5	3	2	3	7	1	1	1	1	1	1	1	1	1	160	309	1.21	
Peritonitis	60	81	5	10	1	2	...	1	14	1	3	13	18	23	16	15	12	6	3	8	2	1	5	...	...	...	...	...	...	...	141	240	.96	
Ascites	9	8	1	...	1	2	...	...	3	...	1	1	1	1	2	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	17	39	.16	
Ulceration of Intestines	1	1	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	4	.02	
Obstruction of Intestines .....	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	.01	
Stricture of Intestines	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	4	.03	
Hernia (Strangulated)	4	5	1	1	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	9	23	.10	
Cirrhosis of the Liver	5	37	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	42	103	.41	
Illeus (Colic)	2	2	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	5	.02	
Loud Colic .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	.01
Lead Disease .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Intussusception	4	3	...	2	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	12	.05
Fistula in Ano .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2	.01
Ulcer of the Stomach	1	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	16	.06
Obstruction of Gall-Duct .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Hepatitis	11	21	...	1	1	...	...	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	35	82	.32
Jaundice	5	6	...	5	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10	27	.11
Liver Disease	10	13	...	2	...	1	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	23	48	.19
Anemia	0	2	...	6	...	...	...	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	11	.04
Hæmatemesis .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	.004
Total Digestive Diseases	294	255	12	117	23	16	5	7	167	9	8	22	29	42	37	44	28	32	16	14	23	22	6	2	2	...	...	...	...	...	549	1,688	4.37	

Deaths in New York—Continued.

MALES.

CAUSES OF DEATH.	NATIVITY.		Colored.	Under 1 year.	1	2	3	4	Total under 5 years.	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100 and up.	Total Males.		
	United States.	Foreign.																														
CLASS III.—Continued.																																
ORDER 5. (URINARY DISEASES.)																																
Nephritis.....	27	10	1	.....	.....	3	2	2	7	9	8	1	2	2	.....	2	2	1	2	1	2	1	1	.....	.....	.....	.....	.....	.....	37	
Nephritis (Bright's Disease).....	110	191	7	1	3	4	2	4	14	5	3	7	18	27	28	20	41	29	1	2	3	1	6	3	.....	.....	.....	.....	.....	361	
Diabetes.....	2	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	
Cystitis.....	9	13	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	
Disease of the Kidney.....	12	11	2	3	.....	1	.....	1	5	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	
Disease of Prostate Gland.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	
Addison's Disease.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	
Stricture of the Urethra.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	
Retention of Urine.....	2	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	
Uremia.....	16	18	.....	.....	.....	2	.....	1	3	.....	1	.....	1	3	4	2	2	8	1	2	1	3	1	2	.....	.....	.....	.....	.....	.....	34
Total Urinary Diseases.....	179	249	13	5	3	10	4	6	30	14	7	8	21	35	37	35	53	41	29	24	30	17	12	5	1	.....	.....	.....	.....	.....	428
ORDER 7. (LOCOMOTORY DISEASES.)																																
Arthritis.....	1	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Hip-Joint Disease.....	14	6	.....	.....	.....	1	.....	1	2	8	4	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20
Disease of the Spine.....	10	5	.....	.....	.....	1	.....	.....	4	3	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15
Curves of the Spine.....	7	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
Necrosis.....	6	4	8	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
Rachitis.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Osteo-Myelitis.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Total Locomotory Diseases.....	40	20	5	3	1	2	1	1	8	13	13	2	5	1	2	5	1	2	1	2	60

CAUSES OF DEATH.	FEMALES.																				Total Percentage of each cause on Series.
	NATIVITY		Colored	Under 1 year	1- 9	9- 19	20- 29	30- 39	40- 49	50- 59	60- 69	70- 79	80- 89	90- 99	100 and upwds.	Total Females	Total both Series.	Total	Percentage of each cause on Series.		
	U. S.	Foreign																			
CLASS III—Continued.																					
ORDER 5. (URINARY DISEASES.)																					
Nephritis.....	12	11	2	2	1	1	1	1	3	2	2	10	9	2	3	23	60	24			
Nephritis (Bright's Disease).....	61	152	11	1	4	4	1	12	6	4	5	20	21	23	31	23	273	304	8.15		
Diabetes.....	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	8	.03			
Stone.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	32	.13			
Cystitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	33	.13			
Disease of the Kidney.....	9	9	1	2	1	1	1	2	1	1	1	1	1	1	1	10	33	.13			
Disease of Prostate Gland.....																	1	.004			
Admission's Disease.....																	2	.01			
Stricture of the Urethra.....																	3	.01			
Retention of Urine.....	14	16	2	3	3	1	2	2	2	2	2	2	2	2	2	3	30	64	.26		
Uremia.....																	3	.01			
Total Urinary Diseases.....	121	191	17	5	4	4	9	3	25	19	6	6	29	29	30	312	340	2.97			
ORDER 6. (GENERATIVE DISEASES)																					
Ovarian Dropsy.....	4	9	1	1	1	1	1	1	1	1	1	1	1	1	1	13	13	.05			
Ovarian Tumor.....	3	6	1	1	1	1	1	1	1	1	1	1	1	1	1	9	9	.04			
Uterine Tumor.....	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	8	8	.02			
Uterine Disease.....	9	16	1	1	1	1	1	1	1	1	1	1	1	1	1	25	25	.10			
Metritis.....	5	21	1	1	1	1	1	1	1	1	1	1	1	1	1	28	28	.10			
Neuro-Peritonitis.....	3	17	1	1	1	1	1	1	1	1	1	1	1	1	1	20	20	.09			
Puerperal Peritonitis.....		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	.004			
Pelvic Cellulitis.....		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	.004			
Ovaritis.....		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	.004			
Total Generative Diseases.....	28	76	3	3	3	3	3	3	10	17	6	6	29	29	30	104	104	.42			
ORDER 7. (LOCOMOTOR DISEASES.)																					
Arthritis.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	.03			
Hip-Joint Disease.....	5	4	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	.02			
Disease of the Spine.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	.05			
Curles of the Spine.....	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	6	6	.09			
Nervous.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	.03			
Rachitis.....	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	.01			
Osteo-Mylitis.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	.01			
Total Locomotor Diseases.....	16	8	3	3	3	3	3	3	10	17	6	6	29	29	30	104	104	.34			

Deaths in New York—Continued.

CAUSES OF DEATH.	MALES.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	NATIVE.		Colored.	Under 1 year.	1-	2-	3-	4-	Total under 5 years.	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100 and upwards.	Total Males.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Phlegmon.....	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

Deaths in New York—Continued.

MALES.

CAUSES OF DEATH.	NATIVITY.		Colored.	Under 1 yr.	1	2	3	4	Total under 5 years.	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100 and up.	Total Males.	
	United States.	Foreign.																													
CLASS IV—Continued.																															
ORDER 3. (AGE.)																															
Old Age.....	26	72	5																		1	2	10	23	30	17	11	4		96	
Senile Gangrene.....	2	4																			1		2							6	
Total Diseases of Age	28	76	5																		1	2	12	25	30	17	12	4		102	
ORDER 4. (NUTRITION.)																															
Atrophy	31			30	1				31																						31
Debility.....	154	45	7	127	8	2	1	1	139	2	1		4	7	2	9	3	4	4	2	6	2	4	10						199	
Total Diseases of Nutrition.	185	45	7	157	9	2	1	1	170	2	1		4	7	2	9	3	4	4	2	8	2	4	10						230	
Total of Developmental Class	577	121	16	508	19	4	2	1	533	3	1		4	7	2	8	3	4	4	3	7	4	16							609	

[illegible]

FEMALES.										Percentage of each Cause on Total.		
NATIVITY.		Colored.	Under 1 year.	1	2	3	4	Total under 5 yrs.	100 and upward.	Total Females.	Total both Sexes.	
United States.	Foreign.											
CLASS III.—Continued.												
ORDER 8. (INTEGUMENTARY DISEASES).												
Pneumon.											2	.01
Ulcer.	4	1			2			2			5	.02
Tumor	4	1	1					1			5	.03
Abscess.	8	8	3	1				4			16	.16
Pemphigus.											8	.08
Soletruma.	1		1					1			1	.004
Eczema.	1							1			1	.01
Herpes.											1	.004
Total Integumentary Diseases.	18	9	1	5	3	1	8	3	5	3	28	.34
Total of Local Cause.	2783	1433	102	1227	478	101	57	2070		4220	9302	37.61
CLASS IV.—DEVELOPMENTAL DISEASES.												
ORDER 1. (CHILDREN).												
Premature Birth.	149		3	149				149		149	342	1.37
Preternatural Birth.	3		1	3				3		3	17	.07
Triamus Nascentium.	22		1	22				22		22	42	.17
Hemorrhage from Umbilical Cord.	8		8					8		8	13	.05
Cyanosis.	28	1	29					29		29	75	.30
Spina Bifida.	5		4	3				5		5	12	.05
Atelectasis Pulmonum.	20		1	20				20		20	41	.17
Other Malformations.	18		18					18		18	55	.22
Teething.	20		13	6	1			20		20	41	.17
Total Developmental Diseases of Children.	273	1	6266	6	2	2	274			274	638	2.36

CAUSES OF DEATH.	NATIVITY.		Colored.	Under 1 y'r.	1-	2-	3-	4-	Total under 5 years.	100 and up-wards.										Total Fe-males.	Total both Sexes.	Percentage of each cause on Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	United States.	Foreign.								95-	90-	85-	80-	75-	70-	65-	60-	55-	50-				45-	40-	35-	30-	25-	20-	15-	10-	5-																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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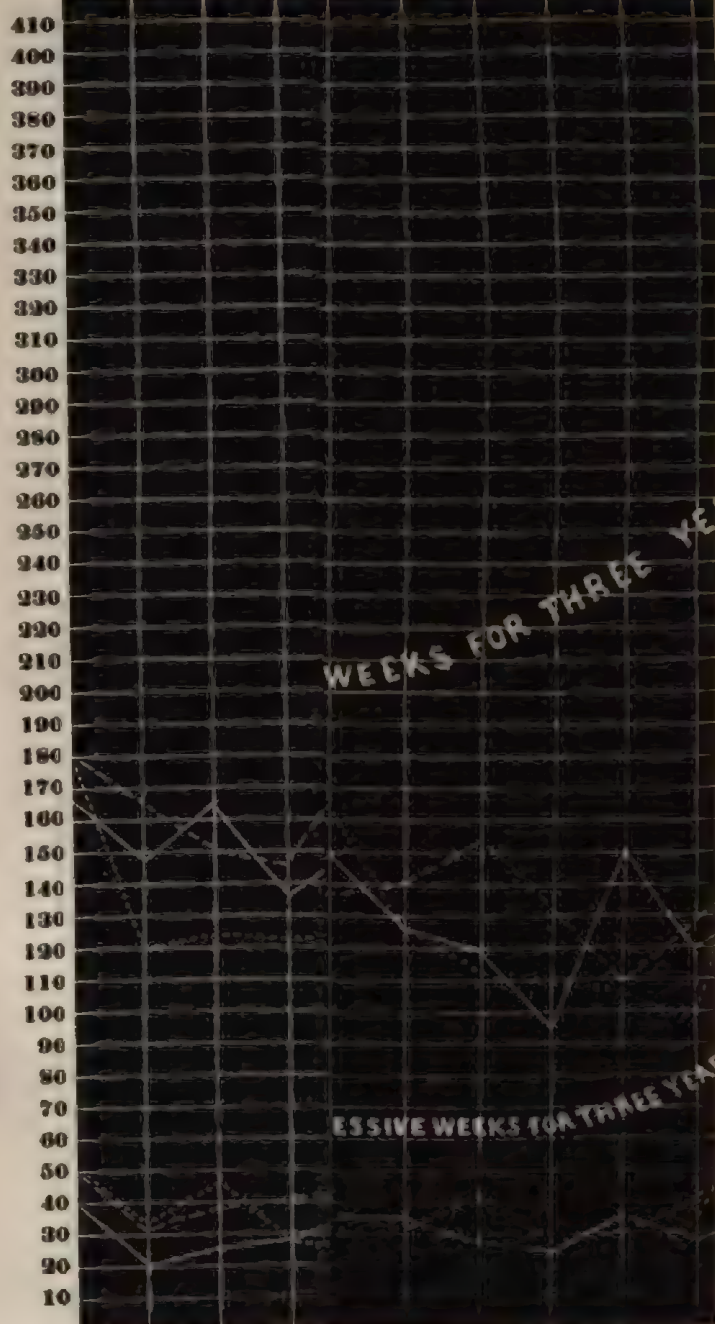






WEEK IN THE YEAR. 1. 2. 3. 4. 21. 22. 23. 24. 25. :

COURSE OF THE DEATH-RATES in BROOKLYN COMPARED in THREE SUCCESSIVE YEARS.



Prepared under
DR. F. J.

NOTES ON THE CHIEF CAUSES OF DEATH.

Comparison of Death-Records of 1868 with those of 1866 and 1867.

At the close of the year 1867 we had occasion to compare the compact tabulations of the records of mortality in New York, in the two years that then ended. There was found to be a total gain of 3,656 lives in that year over the year 1866. The ages of life that chiefly experienced that gain, were found to be "in the most important of the years of manhood and womanhood:—the decade between the twenty-fifth and thirty-fifth years of age." The experience in 1868 has been similar to that in 1867, as regards the periods of life at which the greatest security was enjoyed, but the gains were less conspicuous than 1867, for the latter followed the year of cholera, and the last year has been marked by an excessive mortality in the first five years of childhood. Yet there were 1,926 fewer deaths last year than in 1866; while the increase over the number of deaths in 1867 was 1,730. The periods of life at which these gains and losses, respectively, were made, can easily be read upon the last preceding table, reading to the right hand from the word "*total*."

Two of the facts that appear upon this comparative-abstract of our three years' records, deserve especial notice.

First.—The quantity of infant life that perished in the first twelve months of its existence, last year, exceeded that of 1867 by 693, and also that of 1866, by 388. Further, it is noticeable that these heavy losses to child-life continued up to the close of the second quinquennial; and then that there was but little loss until the age of twenty-five years was reached, the next two five-year periods of life also continuing comparatively secure.

Second.—Looking at the *totals* which are footed up in each *class* of causes, it is noticeable that not only was there an excessive proportion of deaths by the zymotic maladies, but a very great increase in the percentage of deaths from that great class of causes which are chiefly inflammatory, organic, congestive, and complicated. In this class there were 326 more deaths than in 1866, and 715 more than in the year 1867; and it also appears that this great group of causes which prove more fatal in the most decidedly unhealthful seasons, and especially in those that have greatest extremes of temperature, is charged with no less than 37.61 per centum of the total mortality in New York. But in reference to this result, we need to remark that it is found that as we succeed in making the certified returns more and more exact in defining the causes of death, we necessarily augment the total number of certificates in the class of organic and inflammatory, or local diseases, by diminishing the sum of those that would otherwise be charged to the *constitutional* class. For example, we diminish the sum total charged to *phthisis* by obtaining the more accurate diagnosis and certification of deaths by inflammatory diseases of the lungs and thoracic organs, which, in the absence of tuberculosis, must be charged to the local class.

It is designed that this form of annual summation and comparison shall be perpetually continued in each successive annual report. And whoever

desires to compare the records of particular causes of death, year by year, can do so, if he has the successive volumes before him. The diagrams accompanying this review of three years' records, show at what periods [weeks] in the respective years gains or losses occurred.

THE RECAPITULATION FOR THE YEAR.

This page [490] of the report presents several points that will be profitably studied. The more important facts are (1.) The relative quantities of mortality in the different *classes* of causes, and of the *foreign* and the *native* born. (2.) Continuing this reading at the left hand of the page, an important summary of mortality in infancy and childhood is presented. (3.) Upon the right hand of the page, the particulars may be read concerning the share each class of causes had in the total mortality; and (4.) The bottom lines present the summation and percentages on total mortality, by *ages* and *sexes*.

TENEMENT HOUSE MORTALITY.

That the marvellous increase of population in the narrow limits of our insular city of New York should have given rise to peculiar conditions of housing and excessive domestic crowding, excessive death-rates and great practical difficulties in bringing to bear sanitary measures adequate to the exigencies of particular classes of the population, is a natural result of the unprecedented movement of population towards the centre of emigration and wealth. On every hand the fact is admitted that such packing of human beings, and particularly of the poor and uneducated classes, has at last become a source of sanitary and social peril. The excessive mortality year by year in the tenement house quarters of the city indicated to us the duty of instituting a system of special registration for sanitary purposes of all deaths occurring in dwellings that are known in the law as tenement houses. A volume would not contain the results which the first year's experience in this registration would yield, and we shall not attempt a complete analysis of these records until the experience of another year has been acquired. Indeed, we venture to hope that before the end of another year this inquiry into the causes and local circumstances of death in the tenement houses may be so associated with a systematic sanitary inspection of them, and a report upon diseases that prevail in them, that the second report may have vastly more significance and value than this preliminary record.

The Board of Health has permitted us to institute this inquiry, but when the sanitary inspection and the overcrowded and unventilated tenements is followed out to the logical consequences of the precise kinds of information that will, or at least should be, in the possession of the Board, it must be that comprehensive measures for improving the domiciliary condition of the poorer classes will follow.

The compact massing of the laboring and the lower classes in New York presents some of the most difficult problems that sanitary science has to solve. But with a plastic, hopeful and earnest class of people, such as those

poor are who should now be the first to receive the proffer of more healthful habitations, it may reasonably be hoped that the day is not distant when the chief evils of the existing tenement system will be overcome. Profoundly impressed with the importance of having in the hands of the sanitary authorities an exact and permanent kind of health records, or at least of death records relating to the tenementry of the metropolis, we committed this branch of vital registration to an educated and well qualified gentleman, Mr. Norris R. Norton, whom the Board kindly allowed to be detailed for service in the Bureau, and we now submit a report and partial digest of the records which have come under his care. No commendation of this labor of Mr. Norton can add to the peculiar interest and the desire for reform which the mere perusal of this graphic and half arithmetical statement he has derived directly from the certificates of death will convey to every thoughtful reader.

SPECIAL RECORDS OF THE MORTALITY IN TENEMENT HOUSES.

To the Registrar of Vital Statistics, Metropolitan Board of Health:

In making a special study of the tenement house mortality in the city of New York for the current year, you directed the class of records relating to it to be kept in accordance with a theoretical division of the city into three districts, for the purpose of grouping, as nearly as might be possible without too many divisions, certain classes of population having similar habits and customs—for these were known to differ widely among different classes—and pursuing vocations which partake of the same general characteristics. The tendency among the foreign-born population to form separate colonies for each distinct nationality suggested, and, to a certain extent, aided the practical application of this plan to the investigation of causes of death in their relation to the circumstances and conditions under which these people are necessarily housed.

After a thorough canvass of the entire subject, the objects which were in view in making this division, it was thought, would be partially, if not wholly, attained by making Catharine street, the Bowery, Fourth avenue and Fourteenth street the interior boundary lines (the rivers being the exterior), and thus grouping all the wards of the city into three districts, as follows:

First District, comprising the First, Second, Third, Fourth, Fifth, Sixth, Eighth, Ninth, Fourteenth and Fifteenth wards.

Second District, comprising the Seventh, Tenth, Eleventh, Thirteenth and and Seventeenth wards.

Third District, comprising the Twelfth, Sixteenth, Eighteenth, Nineteenth, Twentieth, Twenty-first and Twenty-second wards, embracing all that portion of the city lying north of Fourteenth street.

This division, purely arbitrary as it is, has been found exceedingly useful; and, by the experience of the year, proves to have been made with a nice

perception of the points of similarity in the inhabitants of the tenement houses of the various wards of which each district is composed, as well as of those points in which they differ. Thus far, no change has been deemed advisable, and it is scarcely probable that any will become necessary, at least, in the immediate future. Hereafter, if this work be continued, the natural progress of the city, the constantly shifting center of population by the migration of the poorer and industrial classes to other quarters, and new commercial enterprises which will absorb certain portions now used for residences, will perhaps render a new grouping of the wards into districts a matter of necessity; but, until such exigencies arise, these districts, as they are now mapped out, will be all that are needed for the study both of the sanitary conditions and the social circumstances which, in a broad and general way, influence the health of the inhabitants of tenement houses.

It has become an axiom in sanitary science that the crowded proximity of dwellings in towns and cities produces morbid mental and physical conditions in the inhabitants. But these conditions multiply in a rapid geometrical progression when dwelling houses are not only crowded upon every available foot of the surface area, but the buildings themselves are so arranged as to compel families and members of the same family into the closest companionship consistent with social and domestic decency. In many instances even these bounds have yielded to the pressure of population, and, in some places, overcrowding has been permitted to such an extent that privacy is impossible, and the grossest offices of nature are often performed in full view of the young and old of several neighboring families. These facts fully explain the necessity for the closest inspection, in a descending scale, from a sanitary point of view, of every district, block, street and house in which death occurs from preventable causes, before it is possible to arrive at the best results of any effort to preserve the general health or to protect the public from a needless and preventable mortality.

Considerations similar to these have been in view from the first organization of the Metropolitan Board of Health, and have uniformly controlled such investigations as these by the Bureau of Vital Statistics. These studies, therefore, though by no means complete in every particular, include the sanitary conditions of the districts mentioned above, of the more populous blocks in each district, of each street consisting mainly of tenement houses, and finally, of such houses, as from their excessive mortality, seemed to deserve or invite special examination. In making the first annual report of this branch of the Bureau the plan indicated above will be followed as nearly as may be, and such general or special facts will be stated under each head as appear to be best calculated to point out the places where the applications of sanitary science are most needed, and to indicate the remedies which promise to be most efficacious in reducing the death-rate in specific localities.

The districts into which the city has been divided differ very materially in their topography, area, population and in the number of houses of the class to be specially examined, and even the wards of which they are com-

posed have certain peculiarities of their own which give each, as it were, a distinct individuality. On the other hand, there are many conditions, both sanitary and social, which are common to all the districts. Nevertheless, they have a kind of homogeneity that enables each to be analyzed separately, not only with reference to causes of sickness and mortality, but also with regard to the social habits and conditions of the people.

Before proceeding with any general or detailed description of these districts, it seems fitting that the tenement-house mortality of the entire city, during the nine months embraced in this report, should be presented in some tabular and statistical form. For this purpose, the number of tenement-houses in which deaths have occurred and the number of deaths in these houses, are herewith presented, street by street, in alphabetical order. As a basis of such statements, as will be found necessary hereafter, it is believed that this tabulation, which presents, at a single glance, the distribution of the tenement-house mortality for the period under consideration, will serve a better purpose than any other form in which these statistics could be offered. As a table of reference it will be invaluable in such comparisons as may be suggested in future studies of this kind. It points out the streets in which fatal influences are most prevalent among the tenement-house population; and may be regarded as an index to those places which most need such sanitary labor as may be advisable in protecting the poor and industrial classes from those special enemies to life which most frequently harbor in their homes and desolate their firesides.

This table, together with the one which follows it, presenting a statement of the mortality, by months, in each of the three tenement-house districts, will be used in the following report to illustrate such facts as may be deemed of service in the general analysis of the social or physical conditions which tend to destroy the lives and health of the huddling poor of the city. But the latter table is especially worthy of study as showing, in a manner at once impressive and instructive, the class of houses that death most frequently visits, and the moiety of the population which annually yields by far the larger proportion of the mortality of the city.

Table Showing the Number of Deaths in Tenement-houses, and the Number of Tenement-houses in which Deaths Occurred, by Streets and Avenues, in the Nine Months ending October 31st, 1867.

NAME OF STREET.	Number of Tenement-houses in which deaths have occurred.	Number of deaths.	NAME OF STREET.	Number of Tenement-houses in which deaths have occurred.	Number of deaths.
Albany	4	7	Desbrosses	6	9
Allen	50	82	Dey	1	1
Amity	4	4	Division	32	41
Amity Place	5	5	Dominick	6	6
Ann	2	2	Dover	4	5
Attorney	32	50	Downing	6	10
Avenue A	77	129	Doyers	2	3
Avenue B	69	106	Duane	5	7
Avenue C	73	107	East Broadway	27	33
Avenue D	17	21	East Houston	57	88
Bank	4	4	East Fourth	81	128
Barrow	2	2	East Ninth	82	106
Batavia	3	5	East Tenth	43	52
Battery Place	2	2	East Eleventh	104	163
Baxter	58	100	East Twelfth	83	132
Bayard	16	118	East Thirteenth	66	115
Beach	3	3	East Fourteenth	51	91
Beaver	2	2	East Fifteenth	15	34
Bedford	4	5	East Sixteenth	36	55
Beekman	2	3	East Seventeenth	28	51
Bethune	1	1	East Eighteenth	29	41
Birmingham	4	7	East Nineteenth	22	35
Bleeker	13	14	East Twentieth	15	17
Bowery	10	10	East Twenty-first	23	39
Bridge	3	4	East Twenty-second	26	38
Broad	1	1	East Twenty-third	19	25
Broadway	25	35	East Twenty-fourth	22	33
Broadway alley	3	3	East Twenty-fifth	25	27
Broome	67	81	East Twenty-sixth	14	19
Canal	35	46	East Twenty-seventh	8	10
Cannon	23	38	East Twenty-eighth	29	44
Carlisle	3	3	East Twenty-ninth	22	30
Carmine	11	13	East Thirtieth	6	7
Caroline	1	1	East Thirty-first	21	30
Carroll Place	2	2	East Thirty-second	28	38
Catharine	10	12	East Thirty-third	28	30
Catharine Slip	1	1	East Thirty-fourth	22	34
Cedar	0	7	East Thirty-fifth	22	27
Centre	10	13	East Thirty-sixth	6	9
Centre Market Place	5	5	East Thirty-seventh	9	13
Charles	4	6	East Thirty-eighth	12	15
Charlton	22	25	East Thirty-ninth	8	9
Chatbam	10	10	East Fortieth	8	9
Cherry	114	205	East Forty-first	17	25
Christopher	11	12	East Forty-second	11	13
Chrystie	58	95	East Forty-third	3	3
City Hall Place	5	7	East Forty-fourth	1	1
Clarke	9	9	East Forty-fifth	9	12
Clarkson	11	12	East Forty-sixth	22	22
Cliff	2	2	East Forty-seventh	29	36
Clinton	45	70	Eighth	56	71
Clinton Place	2	2	Eighth avenue	86	110
Columbia	23	33	Eldridge	42	70
Commeroe	1	1	Eleventh avenue	53	77
Congress	2	2	Elizabeth	55	89
Cornelia	6	6	Elm	19	27
Crosby	18	32	Essex	53	91
Dalancy	62	91	Fifth	108	158
Depeyster	1	1	First	24	31

NAME OF STREET.	Number of Tenement-houses in which deaths have occurred.	Number of deaths.	NAME OF STREET.	Number of Tenement-houses in which deaths have occurred.	Number of deaths.
First avenue	181	277	New Bowery	2	2
Forsyth	66	115	New Chambers	5	8
Fourth avenue	29	33	Ninth avenue	104	122
Frankfort	8	14	Norfolk	49	94
Franklin	12	15	North Moore	8	12
Front	1	1	North William	1	1
Fulton	1	1	Oak	16	30
Gansevoort	8	11	Oliver	23	37
Goerck	26	39	Orchard	50	92
Gold	1	1	Park	19	32
Gouverneur	11	11	Patchen place	2	2
Grand	29	36	Pearl	40	57
Greene	21	26	Peek slip	1	1
Greenwich	107	164	Pell	2	7
Greenwich avenue	13	15	Perry	17	22
Grove	4	5	Pike	9	12
Hague	2	2	Pitt	38	61
Hamilton	17	24	Prince	18	25
Harrison	8	8	Reade	4	5
Henry	32	70	Rector	8	9
Hester	42	57	Renwick	2	3
Horatio	3	4	Ridge	43	39
Howard	1	1	Rivington	63	96
Hubert	8	10	Robinson	2	3
Hudson	41	44	Roosevelt	12	23
Jackson	14	42	Rose	12	29
Jacob	2	2	Rutgers	3	5
James	24	41	St. John's lane	1	1
James' slip	1	1	St. Mark's place	7	8
Jane	7	7	Scammel	9	11
Jay	3	3	Second	68	112
Jersey	10	19	Second avenue	115	170
Jones	2	2	Seventh avenue	95	121
King	14	18	Seventh	39	66
Laight	6	6	Sheriff	39	63
Laurens	29	65	Sixth	107	149
Leonard	26	42	Sixth avenue	50	60
Leroy	4	4	Spring	42	54
Lewis	52	72	Stanton	70	112
Lexington avenue	2	4	Staple	1	2
Liberty	2	6	State	4	8
Lispenard	5	6	Stone	3	5
Little Twelfth	6	11	Sullivan	38	56
Ludlow	57	93	Suffolk	27	43
Macdougall	3	4	Tenth avenue	114	139
Madison	85	142	Thames	4	5
Madison avenue	2	2	Third	115	213
Mangin	7	12	Third avenue	161	197
Manhattan	3	6	Thomas	7	11
Marion	14	20	Thompson	30	70
Market	7	8	Trinity place	7	13
Mercer	5	7	Unclassified	223	386
Milligan place	1	2	Union court	2	2
Minnetta	3	4	University place	1	2
Minnetta lane	3	3	Vandam	6	6
Mission place	3	3	Vanderwater	14	21
Monroe	70	116	Varick	18	23
Montgomery	8	14	Vesey	2	2
Morris	5	5	Vestry	2	2
Morton	3	3	Water	49	74
Mott	92	166	Warren	1	1
Mulberry	109	244	Washington	101	185

NAME OF STREET.	Number of Tenement-houses in which deaths have occurred.	Number of deaths.	NAME OF STREET.	Number of Tenement-houses in which deaths have occurred.	Number of deaths.
Walker	7	7	West Thirty-eighth	31	34
Watts	16	22	West Thirty-ninth	52	72
Waverly place	3	3	West Fortieth	43	63
Weehawken	3	3	West Forty-first	66	102
West	24	36	West Forty-second	40	60
West Broadway	12	18	West Forty-third	28	36
West Houston	32	40	West Forty-fourth	41	51
West Fourth	7	10	West Forty-fifth	27	31
West Ninth	1	1	West Forty-sixth	21	24
West Tenth	19	24	West Forty-seventh	23	33
West Eleventh	18	22	West Forty-eighth	11	13
West Twelfth	6	9	West Forty-ninth	16	22
West Thirteenth	20	20	West Fiftieth	7	10
West Fourteenth	2	3	West Fifty-first	16	18
West Fifteenth	9	9	West Fifty-second	27	35
West Sixteenth	39	64	West Fifty-third	26	31
West Seventeenth	38	56	West Fifty-fourth	8	11
West Eighteenth	31	42	West Fifty-fifth	3	3
West Nineteenth	36	51	West Fifty-sixth	2	2
West Twentieth	20	23	West Fifty-seventh	3	3
West Twenty-first	7	8	West Fifty-eighth	1	2
West Twenty-second	5	8	West Fifty-ninth	1	1
West Twenty-third	40	61	West Sixtieth	3	4
West Twenty-fourth	53	88	West Washington place	1	1
West Twenty-fifth	54	87	White	2	3
West Twenty-sixth	47	68	Whitehall	46	77
West Twenty-seventh	50	73	Willett	14	20
West Twenty-eighth	42	60	William	16	21
West Twenty-ninth	39	56	Woolster	7	13
West Thirtieth	40	54	Worth	7	8
West Thirty-first	42	54	York	7	8
West Thirty-second	35	49			
West Thirty-third	37	44	Total	7,789	11,571
West Thirty-fourth	34	38			

Table showing the Comparative Mortality of the Tenement House Districts, by Months, from February* to October, 1868.

MONTHS.	First District.	Second District.	Third District.	Total.
February	266	298	233	997
March	263	429	342	1,034
April	277	426	369	1,072
May	277	421	337	1,025
June	233	361	307	901
July	518	894	846	2,258
August	443	804	684	1,931
September	337	520	469	1,326
October	346	410	371	1,127
Total	2,600	4,663	4,048	11,311
Total mortality in the first three quarters of 1868..	4,647	5,633	9,654	20,134
Number of tenement-houses	8,985	7,622	6,995	16,562
Number of dwellings, census 1865	12,259	11,808	24,777	49,644
Population, census, 1865	187,380	233,403	366,703	726,386

The above table showing, 1st: The number of deaths in tenement-houses during the nine months embraced in this report as compared with the total mortality of each tenement-house District in the first three-quarters of the current year 1868; 2d, the number of tenement-houses in each District compared with the whole number of dwellings, as given in the census of 1865; and 3d, the population of each District, according to the same census, will form the basis of certain statistical statements which need to be made in the following general description of the different tenement-house districts. It is to be regretted that there is no accurate census of the tenement-house population; for this would furnish the only element now wanted for a full and complete understanding of the exact effect of modes of housing upon the general sickness-rate and death-rate of the city.

The First District.

The lower portion of the First District is almost entirely given up to the commerce of the city. It is filthy to the last degree of civic and domestic uncleanness, and is peopled with a class that is pre-eminently improvident, consisting mainly of newly arrived emigrants and others who are compelled to seek and find a livelihood about the docks and piers and along the water-

[* As it required one month of patient effort to secure sufficiently accurate returns concerning the kind of dwellings in which the deaths occurred daily, the public records of this new branch of inquiry date from February 1st, 1868, instead of from the beginning of the year, as was originally designed.—E. H.]

sides. Socially it is in some respects the very worst district in the city, and contains numerous lodging-houses, dance-houses, drinking-dens and brothels, which not only serve to perpetuate the degradation upon which they exist, but also to swell the annual death-rate of the district to a magnitude which would be frightful if its causes were not thoroughly understood.

The upper and western portion of the District is very much better than that already alluded to, although there are many unwholesome spots and filthy tenements to be found in almost every part of it. A large majority of the teamsters and cartmen of New York are housed in this part of the city, and their numerous stables add not a little to the general discomfort, and aid very materially in augmenting the mortality of the District. This portion of the population, however, is mainly a thrifty, economical and industrious class, and in these respects is the very reverse of their neighbors of the lower wards.

As a whole, the District is not very inviting either in a social or sanitary sense. It contains five public markets, six first class hotels, with a large number of the baser sort, more than two-thirds of all the drinking-dens and brothels, with a large majority of the gamblers and thieves, of the city, together with 3,965 tenement-houses, according to the most recent count of these dwellings, and a population which the census of 1865 numbers at 187,280 persons. From the social point of view, notwithstanding the excellent moral quality of a large portion of the inhabitants of the Eighth and Fifteenth wards, and nearly all the residents of the Ninth ward, it falls far below the standard that obtains in either of the remaining Districts. It is not only the commercial center of the Metropolitan District, but it is also the center of its vice and crime. The Five Points of New York, whose former depravity has passed into the annals of history, still remain, in spite the Mission that has been built upon the ruins of "The Old Brewery," invested with much of the hideous immorality which gave this locality so disgraceful a notoriety. The recent efforts of certain badly-advised, but very benevolent and religious men, to counteract the evil influence of the dance-houses, brothels and rat-pits of the Fourth ward, served only to bring them into a clearer light, and to expose their glaring debauchery to the public view. Little was accomplished toward their reform, and they too remain, in spite of all efforts for their removal, a dark and apparently indelible stain upon the moral character of the city. From Canal street to Fourteenth street, Broadway is flanked, throughout almost its entire length, two blocks deep, by brothels which, day by day and night after night, disseminate an infection that imperils the health and lives of all classes of people to an extent that cannot be measured by its results in the Metropolitan District. The most loathsome diseases radiate from these infamous dens as a center, and penetrate the remotest parts of the country to afflict families that have no adequate notion of the source of their maladies or the debauchery to which they are to be charged. This subject has already been presented in a just light by the Sanitary Committee of the Metropolitan Board of Health in a communication to the Legislature of the State, published in the

Board's Second Annual Report. But the evil is so great and its influence upon the public health so wide-spread and so deadly, that it cannot wisely be ignored in any statement of the local, physical or social conditions that demand the care and control of the Sanitary authorities. The physical and moral health of the District has recently been somewhat improved by the organization of certain societies whose object is to counteract, as much as may be possible, the influence of this debauching trade, by an effort to reform those who have become its victims. Two institutions of this kind—"The Home for the Fallen," No. 22 W. Houston street, and "The Midnight Mission," No. 23 Amity street—are located within the First District, and are doing much, in a quiet and unobtrusive way, to elevate its moral and social status. Independent of the individual reforms they may accomplish, these institutions will be able to confer an incalculable benefit upon society by the publication of a class of statistics which they only have an opportunity to collect. This would naturally seem to be one of the first duties they owe to the community by which they are sustained; for, seen in the light of an accurate statistical statement of observed and experienced facts, the causes and results of public impurity and private incontinence will come to be better understood, and society will no longer be compelled to hide or ignore the existence of an evil which owes much of its prevalence to the belief that it cannot be prevented or controlled. By these means it will become possible to check and obviate much of the needless sickness and mortality which now augments the death-rate of the down-town wards to an amount altogether unwarranted by any causes save those which pertain far more to the personal, domestic, moral and social uncleanness of their inhabitants than to those causes which can be referred to the merely sanitary condition of the District.

Nevertheless the First District has many evils that can be remedied only through the applications of sanitary science to the topography of the District. The sewerage of certain of the lower wards is dangerously defective, and the local cleansing, scavenging and subsoil drainage, undeniably deficient. The First, Fourth, Sixth, Eighth and Fourteenth wards are especially noticeable in these respects. The tenement-houses suffer in many instances from defective house and lot drainage, and almost uniformly from a lack of care and of sufficient ventilation. The District has a larger proportion of these dwellings in bad sanitary condition, than any other in the city, nearly sixty-three per centum of the whole number being in a state that can only be regarded as "detrimental to health and dangerous to life." The total mortality of the District in the first three-quarters of the current year was 4,647. The mortality in tenement-houses, during the nine months for which this record has been specially tabulated, was 2,860. These periods of time are not exactly alike; for the former includes January and excludes October, while the latter includes October and excludes January. The mortality of these two months varied so slightly, that for the purpose of comparing totals they may be regarded as equal. The record shows that a little less than one-half of this mortality occurred in the private houses,

boarding-houses, hotels and public and private charitable and penal institutions of the District.

The Second District.

This subdivision of the city is situated east of Catharine street, the Bowery and Fourth avenue, and south of Fourteenth street. From its western boundary to First avenue, the slope is gradual and continuous, having an excellent grade for surface drainage. The remainder of the District is flat, and has very little elevation above tide-level. It is the most densely peopled part of the city—the Seventeenth ward, which comprises less than one-fortieth of the total area of the city, alone containing not less than one-tenth of the whole population. A recent census of this ward, by the Sanitary Company of the Metropolitan Police, showed that 4,120 houses contained 95,091 inhabitants, of whom 14,016 were children under five years of age.* The Eleventh ward is still more densely populated, the rate being not less than 200,000 to the square mile, and giving scarcely sixteen yards to each person. The evils of overcrowding, whether of surface area, or of dwelling-houses, may here be seen in their most aggravated form. The Seventh, Tenth, and Thirteenth wards are also very much crowded, the average number of square yards to each person being about twenty. It is rather the conditions under which these people live, and the vicious method of housing, which render the evils arising from the contact of families so much more virulent here than in other parts of the city. Under more favorable circumstances, the area is amply sufficient for the population. But the house accommodations are thoroughly inadequate. These facts will be more clearly seen when we come to examine single streets and blocks,

* This census, which is believed to be accurate and trustworthy, contains details of 3,628 front, and 492 rear buildings, of which 3,584 are brick, 414 frame, 118 stone, while four are composed of iron. The population, front and rear, is shown in the following table :

	Front Buildings.	Rear Buildings.	Totals.
Number of Families.....	18,413	2,796	21,209
Number of Persons.....	84,129	10,962	95,091
Number of Males (adult).....	25,461	3,090	28,551
Number of Females (adult).....	28,704	3,552	32,256
Males between 5 and 14 years.....	7,490	1,202	8,692
Females between 5 and 14.....	7,362	1,161	8,523
Children under 5 years of age.....	12,208	1,808	14,016
Basement population.....	2,904	349	3,253

Excluding Tompkins square, which has an area of nearly eleven acres, the Seventeenth ward contains 331 acres, or 1,602,040 square yards, and consequently has an area of a little more than one-half—or still more accurately, fifty-two one-hundredths—of one square mile. The increase in population from 1865 to 1867, providing the census was accurately taken at both times, was 15,528. According to these figures, there is 16.83 square yards to every inhabitant of this ward, and a population equal to 182,867, to the square mile. The ward contains three hotels, 117 liquor stores, 358 stables, eight distilleries, nine breweries, thirteen schools (eight private, and five public), and fourteen churches. It also contained at the time this census was taken, thirty-two slaughter-houses, five fat-melting establishments, four smoke-houses, four pork-packing establishments, and seven sausage factories, but many of these disagreeablenesses have been removed under the improved sanitary regime of the Metropolitan Board of Health.

which illustrate these general remarks, and show the relations which the method of housing a population bear to the possibilities, in a sanitary sense, of accommodating large numbers of people upon a small and circumscribed area.

The population of the District is mainly foreign-born, the Germans being largely in the majority. It is composed in a very large part of those industrial classes who depend upon the various trades for a livelihood, including a large colony of rag-pickers, to whom special reference will be made on a subsequent page. As a whole, the people of this District are industrious workers at their various avocations, and are superior to the poorer classes of the First District in this: they are self-supporting and are less vicious. They need hospitals rather than prisons; and tax the public charities more through their misfortunes than their crimes.

The District is free from those more aggravated evils which are so prominent in the Fourth, Sixth, Eighth and Fourteenth wards. For this reason, the moral health of the inhabitants is better, and the question of sanitary care is somewhat disassociated from the exceedingly important question of social reform. In the First District these things are so intimately blended that they cannot be separated in any discussion of the means to be employed in the protection of the health of the inhabitants. They must be regarded and treated as parts of the same problem. In the Second District there is less immorality and less vice and crime, and the two may be dealt with as distinct problems. Nevertheless, in the last analysis, these subjects so act and re-act upon each other that whatever promotes the one, to a certain extent aids the other. For mental and moral freshness and purity are invariably modified by external conditions, and the way in which they may be most easily secured to large masses of people seems to lie mainly through bodily health and physical vigor. In the Second District the sanitary wants of the people are principally domestic and domiciliary—wants that may readily be met by a remedy of the merely architectural mistakes that prevail to an enormous extent in the dwellings of the poor and industrial classes. When isolation can be secured to the families residing in this District; when sunlight and fresh air can be let into their living-rooms and dormitories freely and unrestricted as to amount; when methods of house-drainage, scavenger and sewerage are so far perfected as to provide for the immediate removal of all manner of kitchen offal and domestic filth; when, by the application of mechanical skill and ingenuity, personal cleanliness and domestic comfort and social decency become possible to the inhabitants without regard to their earnings or avocations—then the more important sanitary problems of this District will have been solved. These are the difficulties to be overcome, and to achieve all these, sanitary science is entirely adequate. What remains to be done is to direct these feasible sanitary reforms with precision and prudence, and to apply such rules as may be needed with firmness and vigor.

The total population of the five wards comprising this District in 1865 was 233,403. This, however, has been greatly increased since that census

was taken, as is shown by the police census already noticed in referring to the density of population in the Seventeenth ward. The total mortality of the District in the first nine months of the present year was 5,633; the mortality in tenement-houses, in the nine months ending October 31, was 4,663, or 82.78 per centum of the total. The number of tenement-houses is 7,622, of which 3,699 were in "bad sanitary condition" at the time of their last general inspection. The last fact explains in a great measure the excessive mortality of the class of dwellings to be specially considered in this report. The statement that only 970 deaths occurred in all the hotels, boarding-houses, private residences and public institutions in a total mortality of 5,633, is sufficient evidence that some specific local causes were at work in the remaining dwellings to produce a result so disproportionate and so painful. What these causes were, as seen in the light of such knowledge as we have of the more controllable and preventable of deaths, will be more clearly shown when we come to examine the District in detail, and to point out the local circumstances under which the larger part of this tenement-house mortality occurred. For the present purpose of giving a general outline of the moral, social and physical conditions which affect life and health in this District, it is believed the above general statements will suffice. The main facts being based on accurate statistical data, the necessary deductions and their consequent corollaries seem to be evident.

The Third District.

The third and last group of wards set apart for examination in regard to the housing of the poor, in its relation to the general health, embraces all that portion of Manhattan Island that lies north of Fourteenth street. Topographically, this District presents a very great variety of soil, surface and local condition. The somewhat elaborate description of these peculiarities and diversities in the last Annual Report of the Bureau of Vital Statistics (pp. 106, 107, 108 and 109), relieves your reporter of the necessity of referring to this topic save in the most rapid and general way. The insufficient sub-soil drainage of Murray hill; the saturated soil of the eastern margin of Eighteenth and Twenty-first wards; the rapid transition of the Nineteenth and Twenty-second wards from rocky ridges and tortuous water-courses to paved thoroughfares and densely peopled squares; the unhealthy lowland known as Harlem Flats, and the sanitary benefits bestowed upon the District by the health-giving beauty of Central Park, are so familiar that their repetition here would prove "tedious as a twice-told tale." Nevertheless, these circumstances must be borne in mind as a very important element in the problem the Metropolitan Board of Health is called upon to solve. They lie at the very foundation of the study of preventable causes of sickness and death, and require the best efforts of the Sanitary Inspector, together with the most consummate skill of the Sanitary Engineer.

From the social point of view, every grade and class of society—the vir-

tuons and the vicious, from the bone-picker to the banker, from the mendicant to the millionaire—may be found in this District, in some places removed from each other less than the distance across a single block. It is the most fashionable part of the Metropolis, and contains a large proportion of its wealth, culture and refinement; and yet some of the finest private residences of the city overlook the stagnant and reeking filth of the shanties that flank the Central Park.

The average social condition of the inhabitants of this district is very much higher than that of either of the districts already described. But it is not possible in the very general nature of any description that may be made of the district as a unit, to do more than suggest the fact which here more aptly than in any other part of the city illustrates the familiar adage, "*Les extremes se touchent*," for there is probably no place in the world wherein civic cleanliness and private virtue so nearly coalesce with domestic filth and social degradation. Starting from the Fifth avenue, which is topographically and socially the highest part of the district, and going to the river, east or west, through almost any of the numerically named streets, the visitor will pass from the elegance and luxury of the most sumptuous wealth through all intermediate grades to the homeliness and discomfort of the most abject poverty.

In the Third District, as elsewhere, the ground area in many places is fearfully overcrowded. Front and rear buildings encumber the surface of the lots fronting nearly every street. The rows in the rear are almost invariably built back to back—very frequently with no intermediate space whatever. These houses, similar in structure, from cellar to the roof, are made to accommodate from two to six families on each floor, and the number of floors is left entirely to the option of the owner. Through and through ventilation, especially in the rear houses, is an utter impossibility. To persons so housed the pure air and bright sunlight cannot come, and the darkness of their domiciles is only surpassed by their own benighted moral and social condition. As a final fact, we find in the darkness of the tenement houses of the Second and Third Districts many circumstances which conspire to perpetuate that vice which in the First District walks freely abroad into the glare of the open day. In the latter, such missions and reformatory institutions as are not afraid to attack vice and immorality upon their own grounds and in their favorite haunts have an open field for their work, but in the former we find the conditions that produce the results these missions endeavor to counteract. Clearly it would be far wiser to make such an effort as will prevent the yielding ranks of vice from being newly recruited, than to attempt to reform those persons who are already its victims. And for such labor there is no field that promises so rapid and so large a harvest as the overcrowded tenement houses of the eastern and northern portions of the city. The tenements of the lower wards will soon give place to the demands of trade. Those north of Fourteenth street will consequently become more crowded and more vicious, and to ignore the social results which must of necessity follow will be fatal,

not only to the health, but also to the best interests of the community already overtaxed in the effort to pay for its vice."

The tenement houses of the Third District, from a sanitary point of view, present examples of the very best and the very worst of their class. They furnish homes for a large number of the laborers and mechanics of the city, as well as for the vast majority of those who, although having more lucrative occupations, are compelled, by the high prices of rents and food articles, to accept a closeness of companionship, both as to families and members of the same family, which, however distasteful, their means will not allow them to avoid.

The dwellings of the class herein specially examined, north of Fourteenth street number in the aggregate 6,995, of which 3,650, or 52.18 per centum of the total, are in a condition prejudicial to the health of their inmates. The population of the District—census of 1865—was 305,703. The total mortality for the first three-quarters of 1868 amounted to 9,854. The tenement houses contributed 4,048 deaths to the mortality of this District in the nine months ending October 31, 1868. A very large portion of the remainder must be charged to the hospitals and institutions under the direction of the Commissioners of Charities and Corrections, all of which are situated in this part of the city, and in the period of time under consideration gave an aggregate mortality of 2,062.

The very small proportion of the mortality of this District which is left to the hotels, boarding-houses, private residences and hospitals (other than those under the control of the city authorities), is sufficient to warrant the belief that there is some element at work in the tenement houses themselves which increases their mortality to an amount far above any normal standard. It cannot all be accounted for by the difference in population; and it seems to be quite clear that certain fatal circumstances are prevalent among one-half of the inhabitants of the city to which the other half is

* The fact that social evils are very intimately blended with the sanitary circumstances of classes of population is now coming to be very generally understood. Indeed, it has been found so prominent wherever the subject of the housing of the poor in towns has been systematically studied, that these two things, namely overcrowded tenements and moral degradation, may be said to co-exist. In treating this subject, after the most exhaustive research into the conditions under which the poor of Great Britain are housed, Dr. John Simon calls the attention of the Lords of the Privy Council to the fact above mentioned in the following remarkable language:

"Though my official point of view is one exclusively physical, common humanity requires that the other aspect of this evil should not be ignored; for wherever overcrowding exists in its sanitary sense, almost always it exists even more perniciously in certain moral senses. In its higher degrees it almost necessarily involves such negation of all delicacy, such unclean confusion of bodies and bodily functions, such mutual exposure of animal and sexual nakedness, as is rather bestial than human. To be subject to these influences is a degradation which must become deeper and deeper for those on whom it continues to work. To children who are born under its curse it must often be a very baptism into infamy, and beyond all measure hopeless is the wish that persons thus circumstanced should ever in other respects aspire to that atmosphere of civilization which has its essence in physical and moral cleanliness, and enhances the self-respect which it betokens." Eighth annual report of the Medical Officer of the Privy Council, page 14.

very slightly or not all exposed. The following table expresses the same fact and shows the extent of these fatal influences upon the tenement house population, and the comparative immunity from death of those who live in private dwellings, in a manner that is not only conclusive, but that admits of no denial :

Table showing the Total Mortality of the City, and the Comparative Mortality in Tenement Houses, Private Residences, Hotels and Boarding Houses, and in the Public Institutions, in each Week, from February 1st to October 31st, 1888.

WEEK ENDING		Public Institutions.	Private houses, hotels, and boarding houses.	Tenement houses.	Total Mortality.
February	8	79	92	331	402
	15	91	110	247	448
	22	79	125	244	448
	29	88	74	275	437
March	7	79	124	279	482
	14	89	202	173	464
	21	77	113	222	412
	28	89	144	247	480
April	4	83	108	272	463
	11	84	147	241	472
	18	116	139	254	509
	25	93	103	239	435
May	2	86	117	250	453
	9	95	112	225	432
	16	76	122	242	440
	23	79	94	234	407
	30	71	123	214	408
June	6	76	76	196	348
	13	81	98	213	392
	20	87	86	214	387
	27	104	101	222	427
July	4	84	53	276	413
	11	96	137	381	614
	18	119	159	764	1,142
	25	85	184	612	781
August	1	81	159	490	730
	8	107	183	461	751
	15	76	123	444	643
	22	131	191	470	732
	29	88	134	434	656
September	5	96	139	384	599
	12	83	117	369	569
	19	86	134	296	515
	26	79	109	266	454
October	3	112	100	260	472
	10	87	95	241	423
	17	91	100	233	424
	24	70	63	236	369
	31	66	113	201	380
Totals		3,439	4,803	11,571	19,813

COMPARATIVE MORTALITY IN TENEMENT HOUSES.

The above table furnishes some very important statistical facts. In the nine months that have passed since this special record of mortality began, we find in the First District 2,860 deaths in tenement houses, 4,663 in the Second and 4,048 in the Third, the number of tenement houses being respectively 3,965, 7,622 and 6,995 in each District, in the order in which they are named.

According to the Census of 1865, New York city contained 49,844 dwellings of all classes. We know that the city now contains 18,582 tenement houses, leaving 31,262 dwellings of a class which may be termed private, although the number includes the hotels, boarding-houses, private residences and shanties of the city. Upon this basis we found the following somewhat remarkable statement, which is merely putting the lines of totals in the preceding tables in new phraseology, namely, while 31,262 houses gave a mortality of 4,803, in the nine months under consideration, 18,582 other dwellings sent no less than 11,571 persons to the grave in the same period. A very large majority of the deaths in the public institutions is composed of persons taken from the tenement houses to die at the hospitals. It is, therefore, entirely within the bounds of probability, if not of absolute truth, to charge 14,500 deaths out of 19,813, the total mortality of the period covered by the above tables, to the tenement house population of New York. It is estimated that these buildings contain one-half of the total population of the city. We now learn that they yield over 73 per centum of the whole mortality. In the present state of sanitary knowledge it is impossible to doubt that much of this waste of life and health is altogether needless and preventable; and it is quite certain, theoretically as well as practically, that whatever is needless depends upon certain local conditions, which may be easily found and thoroughly understood, and whose control is entirely within the scope and province of the sanitary authorities.

When these statistical statements are read in their relation to the districts separately we have similar results. By reference to the tabular statement on page 499, it will be seen that in the First District the whole number of dwellings is 18,259, and the total mortality in nine months 4,647. The number of tenement houses is 3,965, yielding a mortality in the same length of time of 2,860.

In the Second District the whole number of dwellings is 11,808; the whole number of deaths 5,633. The number of tenement houses is 7,622; the tenement house mortality 4,663.

In the Third District the dwelling houses number 24,777; the total mortality in the first three quarters of 1868 amounted to 9,854. The number of tenement houses is 6,985; the mortality in tenement houses in nine months ending October 31, 1868, was 4,048.

In the entire city 18,582 tenement houses yield a mortality of 11,571, while 49,844 dwellinghouses give 19,813 deaths in the same period of time, viz, nine months.

It is believed that no more impressive statement of facts can be made than is embraced in these simple repetitions of what has been previously presented in tabular form. The lessons they teach seem to be of infinite value in making an analysis of the causes of sickness and death, and they afford the surest possible guide to those conditions which demand the closest attention of the sanitary officer in his search after methods for preventing an excessive and needless mortality. These statistics have led us to those places where the death-rate exceeds the normal standard, and among that portion of the population most afflicted with fatal surroundings. It only remains to inquire into such local conditions as are general among the tenement house population to discover the means by which remedial measures may be applied.

It has not been deemed best, in the effort to discover and describe these local conditions, to select the most unfavorable and unwholesome blocks in either of the three districts. The intention has rather been to show, by a few examples selected from certain localities, the average condition of those squares, which are entirely, or in the greater part, given up to the classes that inhabit tenement houses. The lessons, whatever they may be, that are thus taught, will be entirely relieved of any exaggeration in statement, even if that were possible when we are dealing with facts capable of mathematical demonstration, and also from the charge, which might be either maliciously or ignorantly made, of attempting to describe the condition of these people, who are housed but homeless, as either better or worse than it really is. The facts with which we have to deal are sufficiently sad without any verbal coloring.

The general outline already given of the three districts shows that the First is in every respect the worst. Socially, morally, physically and hygienically, the lowest grades among the very low are to be found in what may be justly termed the very heart of the city, namely, the region bounded by Canal street on the north, Chambers street and Chatham street on the south, and by Elm street and Elizabeth street respectively on the east and west. These boundary lines embrace a greater portion of the Sixth ward, but the entire ward is far below the average in each of the phases above named. Next to this in moral and physical degradation, and fully its equal in some particulars, must be mentioned the Fourth ward, which, throughout its entire extent, is peopled by a class for whom no salvation is possible save that which recognizes the fact that it is necessary to begin by preserving the body in the effort to save the soul. The two wards above named are mentioned merely to indicate the places where the social circumstances of the inhabitants are most nearly allied to their sanitary condition. These particularly foul and unwholesome places, together with nearly a dozen unhealthy spots, scattered along the North river, from the Battery to Manhattan Square, have been purposely omitted in the detailed description of special unhygienic squares, while four other localities have been selected, one in the Seventh, another in the Thirteenth, a third in the Eleventh and the last in the Eighteenth ward, as showing very admirably the average sanitary wants of the tenement house population.

THE LACK OF DOMESTICITY IN ITS RELATION TO LOCAL DEATH-RATES.*

The square bounded by Madison, Grand, Corlears, Monroe and Jackson streets, has some peculiarities that very aptly illustrate the subject under consideration. It has forty-four inhabited houses, twelve of which are situated on the rear of lots and furnish homes for fifty-seven families, numbering in the aggregate 226 persons. The entire population of the square comprises 292 families and 1,225 persons. The number of tenement-houses is forty; the tenement-house population, 1,175. The area of the square, which is somewhat irregular in form, is 100,925 square feet, exclusive of streets, which gives a superficial area of 9.15 square yards to each inhabitant of the square. The streets surrounding the square are each sixty feet wide, with the exception of Grand street, which has a width of eighty-two feet. The square contains two lumber yards, five factories of different kinds, half a dozen stables, and its full quota of drinking dens.

During the period covered by this report, eighteen tenement-houses in this square gave twenty-five names to the death-register. In one house, having a population of 121 persons, there were five deaths; in two others, front and rear, with a population of thirty-six persons, there were four deaths; three other tenement-houses, two front and one rear, with an aggregate population of 110 persons, yielded a mortality of six persons; in three others there were four deaths, while in the eight remaining houses, five front and three rear, there were six deaths. These eighteen houses occupy twelve lots, and have an aggregate population of 153 families, comprising 652 persons, and, as already stated, gave a mortality of twenty five in the nine months ending October 31st. Upon this basis the average annual death-rate of the tenement-house population in this square is 27.23 in 1,000.

In this block the houses that have been most severely afflicted are old, and contain a population for which they have no fitness whatever. Most of them were originally intended for private residences, but have been altered by raising new stories upon the old ones, putting in new partitions, and by other modern mercenary notions, transforming elegant mansions into vicious tenements. The house, which more than any other in this square deserves to be remedied, was once a factory, and stands with its end to the street. The windows overlook a small alley, which serves as an entrance, and the entire building from the cellar to the roof is about as inconvenient and vicious as it could possibly be made. By a particularly unwholesome contrivance the halls and stairways are in the rear of the bed-rooms, which have windows about eighteen inches square, opening into the halls, and are altogether useless for purposes of ventilation. The base-

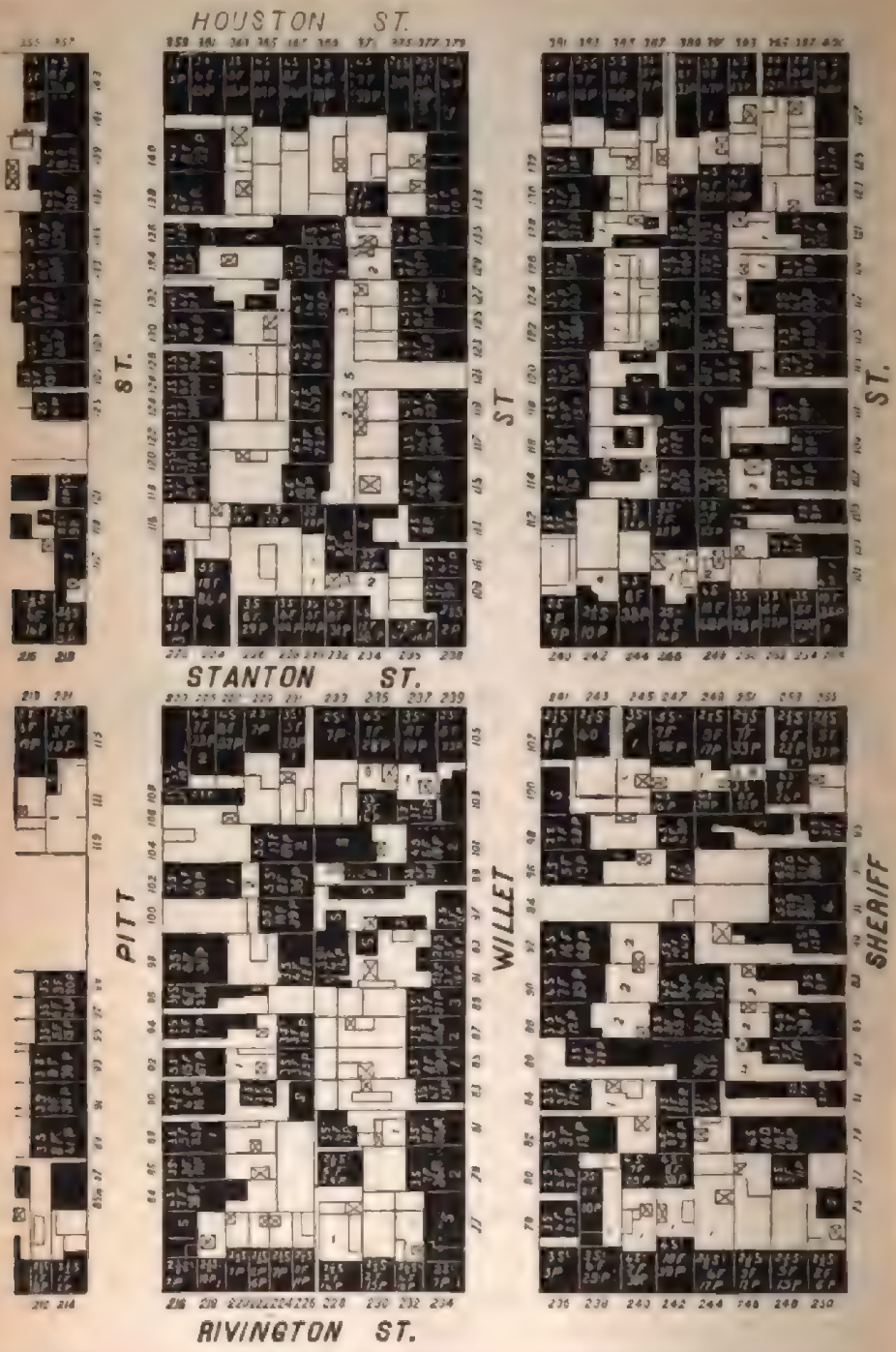
[* The practice of keeping close sanitary watch upon particularly unhealthful and ill-conditioned houses and tenement blocks, as well as upon unhealthful and undrained grounds in the metropolis, was commenced in 1866 in the Bureau of Vital Statistics, and in order more fully to set forth the practical lessons derived from this class of inquiries, the Board of Health permits a few diagrams to be added to this special record of the tenement-house mortality.—E. H.]

ment, which contains six domiciles, has not even this slight advantage, and the rooms are sufficiently dark to merit the stigma that always pertains to dungeons. Four families, consisting of twenty-five persons, now live in these almost subterranean dens, without sunlight and without air. The halls are dark, damp and foul; the bedrooms are in a similar condition, and the living-rooms in every way unworthy of the poor people who huddle in them and call them homes. No less than 121 persons kennel in these degenerate domiciles, and out of this number five were sent to the grave in the period covered by this report. This is the worst house, hygienically considered, in the square, and, as might have been expected, it gave the highest mortality. Similar conditions, though somewhat less in the degree of their unwholesomeness, may be seen in the other houses that have suffered an excessive death-rate, and this naturally leads to the suspicion that the former act as causes upon the latter, while the statistics show not only that the suspicion is well-founded, but they also prove, as conclusively as any exhibit extending over so brief a period of time can prove, that the sanitary wants of the people who reside in the tenement-houses upon this square, are chiefly domestic and personal. The death-rate, although considerably above that of the Fifteenth ward—15.50 in 1,000 inhabitants annually—which may justly be taken as a normal standard, is less than the average annual death-rate of the ward in which the square is situated. But in certain houses, death carried off the inhabitants at the enormous rate of sixty in 1,000, during the year 1868. We are thus again, though by a different route, irresistibly led to the conclusion that the causes of this excessive mortality must be sought, if at all successfully, in the habits of the people and their mode of housing.

From the description given of this square, and the results of the inquiry into its tenement-house mortality, it is quite clear that for the purposes of this report we need look no further. Such unhygienic conditions as exist in the square itself, of course, must have their due weight, and should be taken in the account by the sanitary officers; but here, as their importance is plainly inferior to the domestic surroundings of the inhabitants, and as it is no part of the purpose of this report to consider the collateral circumstances that affect the death-rate of special localities, these conditions need no further mention than that they exist in the filth of the streets, and in the atmosphere tainted with the breath of factories and the odor of stables.

The four squares bounded by Pitt, Sheriff, Rivington and Houston streets, present some peculiarities that are worthy of attention. They are of equal size and have an area of 80,000 square feet each, exclusive of streets. The houses are generally small and old. Out of 225 dwellings, only seventy-two are more than three stories in height, and of this latter number, fourteen have five stories, while only two have six stories each. Some of these three story houses, which were originally intended for a single family, now accommodate—if the term may be allowed—eight families; and one, a small rear house, has a population of thirty-three persons, while two others, facing Willett street, have fourteen families and





fifty-six persons each. In the rear of these two houses are two more, each four stories high, containing sixteen families and seventy persons, and fifteen families and seventy-two persons respectively. The following statistics show rate of crowding:*

Square No. 1, bounded by Willett, Sheriff, Rivington and Stanton streets, contains 8 private houses, with 12 families and 125 persons; 46 tenement houses, with 306 families and 1,300 persons, making a total of 54 dwellings, 318 families and 1,426 persons. The rear houses, 20 in number, have a population of 115 families and 545 persons. The square contains four stables. The deaths in tenement houses numbered 32 in nine months.

Square No. 2, bounded by Willett, Houston, Stanton and Sheriff streets, has 12 private houses, containing 14 families and 126 persons; 51 tenement houses containing 278 families and 1,199 persons, making a total of 63 dwellings, 292 families and 1,325 persons. The rear houses, 20 in number, have a population of 78 families and 409 persons. This square has 11 stables. The deaths in tenement houses were 23 in the same period.

Square No. 3, bounded by Pitt, Houston, Willett and Stanton streets, has twelve private houses, containing 14 families and 110 persons; 44 tenement houses, containing 341 families and 1,378 persons, making a total of 56 dwellings, 355 families and 1,488 persons. The rear houses, 14 in number, have a population of 105 families and 497 persons. The square has five stables. The deaths in tenement houses were 31.

Square No. 4, bounded by Pitt, Stanton, Rivington and Willett streets, has 14 private houses, containing 21 families and 123 persons; 38 tenement houses containing 246 families and 1,015 persons, making a total of 52 dwellings, 267 families and 1,138 persons. The rear houses, 12 in number, have a population of 69 families and 288 persons. This square has 11 stables. The deaths in tenement houses numbered 27.

The four squares contain in the aggregate 81 stables, 46 private dwellings, with 61 families and 484 persons, 179 tenement houses with 1,171 families and 4,893 persons, making a grand total of 225 dwellings, 1,232 families and 5,377 persons. The rear population is contained in 66 houses, and comprises 367 families and 1,739 persons. The whole number of deaths in tenement houses in the period embraced in this report was 113. The death-rate amounted to 28.81 in 1,000 of the tenement house population. The entire area of the four squares is 320,000 square feet, which gives only 6.61 square yards to each inhabitant.

This compactness of population is not equal to, nor is the death-rate so high as, some other squares, although it is 1.58 in 1,000 higher than the

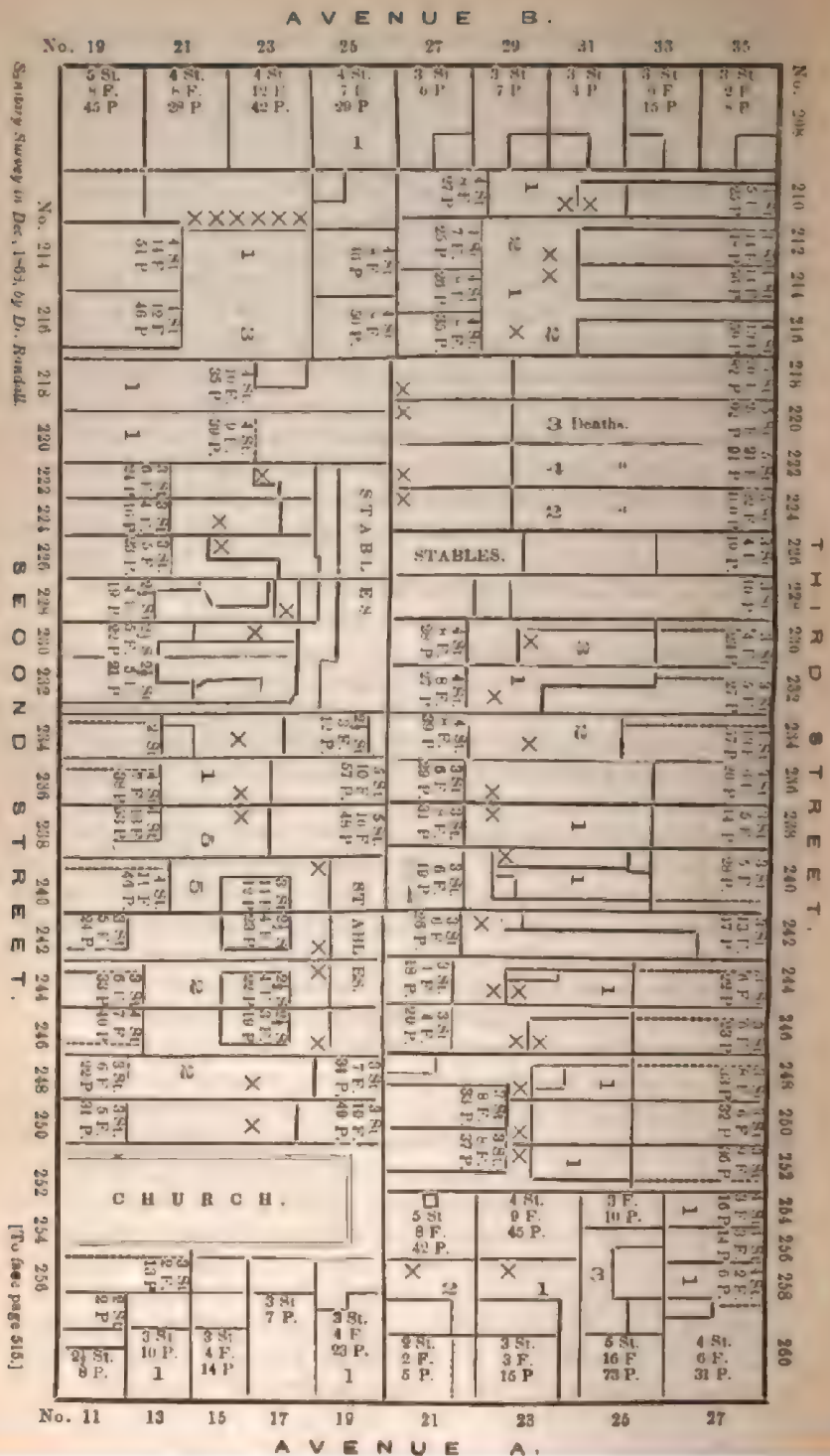
* See the diagram of these four squares on the opposite page. In these blocks the spaces occupied by dwellings are printed black. The height in stories (S), the number of families (F), and the number of persons (P) in each house are printed white. The number of deaths in each house, during nine months, is indicated by white numerals and by numerals printed in the open area. The street number of each house is shown in the respective streets.

square previously described. But when we come to examine the mortality in certain houses, with reference to their hygienic condition and the rate at which they are peopled, we find a state of affairs similar to that already noticed in the tenement houses of the Seventh ward. For instance, one house in Sheriff street, having a population of ninety-six persons, had four deaths in nine months. This house, although one of the most modern in that street, is also one of the most dismal. The bed-rooms are dark and unventilated; the halls closed and fetid, and the entire building arranged wholly with regard to the number of families the space may be made to contain, without any provision for their health or comfort. Two other houses on one lot which faces the same street, with an open privy in the little yard between them, having an aggregate population of fifty-eight persons, yielded a similar mortality. This death-rate is equal to eighty-four in 1,000 annually. Another dwelling in Stanton street is almost as deadly as the two last mentioned. It has the general characteristics already described in the Sheriff street tenement, with the addition of a foul smelling stable in its rear. It gave a mortality equal to nearly sixty in 1,000 annually.

On the other hand, the square bounded by Houston, Stanton, Pitt and Willett streets offers an admirable illustration of the value of local superintendence over a crowded tenement-house population. There is a group of three front and seven rear houses that are under the charge of an agent who not only thoroughly understands his business, but has a remarkable faculty for doing his duty skilfully and conscientiously. The group bears the euphonious title of "Rag-picker's Row." The ten houses contain 106 families, comprising 452 persons. These people nearly all belong to the class called "rag-pickers," although they also gather bones, broken glass and scraps of iron, which they carry to their homes and assort to await the coming of the junk-dealer. Their rooms are cleanly, and have an agreeable odor when compared with the same class of dwellings elsewhere, while an air of comfort and domesticity everywhere prevails among the people, notwithstanding the offensiveness of their avocations and the filth in which they traffic. They send their children to school; put a part of their earnings into the Savings Bank; refer all their quarrels and complaints to the local superintendent of the premises, and some of them migrate to the west, where they take their place among the producers of wealth, after having been saviors from waste. In our statistics this population is charged with eleven deaths, or 1.1 to each house, which is only about one-third of the mortality of some other houses in the same District, or indeed in the same street, while the rate of mortality is not greater than the average annual death-rate of the Thirteenth ward.

In looking over the table of mortality in tenement houses (page 496 of this report), we learn that in Third street 213 deaths occurred in 115 houses during the period embraced in the table. Of this number, fifty-seven deaths took place in thirty-three houses in the block between Avenue B





and Avenue C. In Second street, between the same avenues, forty-one deaths occurred in twenty-four tenement houses in the same period. In Second street two dwellings had five deaths each in the nine months under consideration, while in Third street one house filled four graves, and seven others three graves each in the same length of time.

These facts suggested the propriety of making an inspection of the domestic and social condition of the square bounded by Second and Third streets and Avenues B and C, and taking a census of the inhabitants. The following statistics embrace the result of that examination: Private houses 13, families 17, persons 96; tenement houses 79, families 626, persons 2,741. Totals—houses 92, families 643, persons 2,837. The square has an area of 143,312 square feet, which gives but 5.61 square yards of ground surface to each inhabitant. Of the tenement houses twenty-eight are situated on the rear end of lots, and contain 196 families and 889 persons. A group of stables mingles its odors with those that arise from forty-five open privies, each one of which is used in common by the inhabitants of two or more dwellings. We here find sufficient people to form a moderate sized town on a single square; but they are packed almost as closely as they make graves in ordinary and well regulated cemeteries.

This square is situated on the western verge of the Eleventh ward, which is much more densely peopled than any in the city. According to the census of 1865, as heretofore stated, it contained a population equal to the rate of nearly 200,000 to the square mile, giving an average of 16.1 square yards to each person. The increase has been very rapid since the State enumeration was made; and if the square above mentioned may be taken as a criterion, the rate of crowding is excessive in the extreme. The statistics bring us face to face with the greatest sanitary problem that New York is now called upon to solve, namely, the best method of providing such hygienic conditions as will give the greatest security to life and health among a large population upon a small area, and also of providing means for the equalization and distribution of the population.

The illustrations herewith given of the densely peopled quarters of the city do not yet reveal the closeness of companionship that may be seen in various parts of the city. Another instance of this kind, in its relation to the local mortality, it is believed, will suffice for the purposes of this report. This square has been reserved until the last for the purpose of calling attention to another class of local nuisances against which sanitary warfare has to be made.*

The square bounded by Seventeenth and Eighteenth streets, First avenue and Avenue A, presents some peculiar features that are pre-eminently worthy of the attention of the sanitary authorities. It does not contain a single

[* The block of tenements here described has suffered a fearfully high death-rate for many years. The lime-kiln owners persistently disregarded the orders of the Board, and kept on in their deadly work, which passed over into the *cul-de-sac* in the rear of these tenements no less than 30,000 barrels of carbonic acid gas daily. This nuisance has finally been suppressed by the Board.—E. H.]

rear tenement house, and only fifty-one dwellings of all grades and classes. In Seventeenth street nineteen houses contain 296 families and 1,105 persons, while ten houses in Avenue A have a population of 105 families and 455 persons. This population gave a mortality of forty-three in the period covered by our statistical tables, which is equal to an annual death-rate of 34.61 in 1,000 inhabitants. The other half of the square is peopled at about the same rate, giving a total population of 2,744 upon an area of 112,792 square feet, which allows only 4.57 square yards to each person. The whole number of deaths in the tenement houses of this square, as shown by the record of mortality, was 65.

The interior of the square has for years been partially occupied by lime kilns. The entire population faces the streets bounding the square, while the rear windows of every dwelling overlook the lime burners, who discharge into that pent-up space more than 600 pounds by weight of carbonic acid for every ton of shells consumed. One side of Seventeenth street and both sides of Eighteenth street, in the vicinity of these lime kilns, suffered heavily—the number of deaths in these blocks being exactly equal to the number in the entire square, namely, sixty-five, all of which took place in thirty-six dwellings.*

CONCLUSION.

In looking back over the statistics of tenement house mortality, presented in this report, we invariably find the highest death-rates in those places where surface crowding and domestic discomfort are most prevalent. A few examples, taken from the first tabulated statement of this record of deaths, will suffice. In avenue A seventy-seven dwellings gave 129 deaths. In avenue B sixty-nine dwellings are charged with 106 deaths. In Avenue C seventy-three dwellings yielded 107 deaths. In Baxter street fifty-eight dwellings gave a mortality of 100. In Cherry street 114 tenement houses gave 205 deaths. Chrystie street is almost as fatal as Baxter street. In East Fourth street 128 deaths took place in eighty-one houses. In East Eleventh street the proportion is about the same, giving 163 deaths in 104 houses. In First avenue there were 277 deaths in 181 houses. In Greenwich street 164 deaths in 107 houses. In Ninth avenue 132 deaths in 104 houses. In West Forty-first street 102 deaths in sixty-six houses. In Mott street 166 deaths in ninety-two houses, and in Mulberry street 244 deaths in 109 houses. But in the last named thoroughfare, in one dwelling, an old church that has been degraded into a tenement house, there were no less than seventeen deaths in nine months in a population no greater than may be found in some other crowded quarters.

The facts herein set forth, if they have any meaning whatever, certainly

* It will be noticed that at No. —, on Seventeenth street, there was no death during the nine months. That house was one of the most unhealthful in the block until it was reconstructed entirely three years ago, so that all the rooms have through and through ventilation, and the number of families consequently reduced one half.—E. H.

Sanitary Survey in Dor. 1899, by Dr. F. J. Randall.

EAST EIGHTEENTH STREET.

433	2 Deaths.
435	1 "
437	
439	
441	

No.	402	404	406	408	410	412	414	416	418	420	422	424	426	428	430	434	438
1	304	3	3	3	3	3	21		3								5.27 9.1 P
2																	1.05 5.5 P
3																	1.05 5.5 P
4																	1.05 5.5 P
5																	1.05 5.5 P
6																	1.05 5.5 P
7																	1.05 5.5 P
8																	1.05 5.5 P
9																	1.05 5.5 P
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14																	1.05 5.5 P
15																	1.05 5.5 P
16																	1.05 5.5 P
17																	1.05 5.5 P
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justify the conclusion that local death-rates depend, in a very great degree, upon the manner in which certain classes of the population are housed. Theoretically, the first need of a family is isolation. To escape certain morbid and fatal conditions it appears to be absolutely necessary that each family should be entirely cut off from any compulsory association with neighboring families. As this, however, cannot be secured save by reconstructing nearly every tenement house in the city upon some architectural plan having this purpose wholly in view, it will not be possible to produce any such result for many years to come. But the conditions which are the invariable accompaniment of this lack of domesticity may be modified by such remedies as will naturally suggest themselves to any one who will carefully study the statistics of the tenement house mortality. For the final effect of this unnatural companionship, as shown in the preceding paragraphs, manifests itself in those streets and houses where human packing is rife, and where civic and domestic filth are most frequently and persistently found. This effect is uniformly an excessive mortality, and experience, observation and statistics all prove, both inductively and deductively, that wherever there is domesticity and the isolation of families, there is a healthful population, and wherever there is overcrowding and its concomitant vicious and unclean commingling and "confusion of bodies and bodily functions," there is necessarily a vast amount of immorality, disease and death. To reduce the entire subject to a mathematical formula it would read somewhat as follows: As the mortality in tenement houses is to their total population, so is the fitness of these houses for homes to the physical and moral condition of the inmates.

NORRIS RANDAL NORTON.

TENEMENT-HOUSE DISEASES.

The *inevitable* and the *preventable*, among the causes of mortality, become strangely blended and combined in the unventilated and unscavenged houses of the overcrowded poor. The heavy swelling fluctuations of excess in the lower lines of the mortality, chart [facing page] which indicate the course of the local and chief of the constitutional diseases, are made up largely by the tenement mortality. Consumption and all the inflammatory diseases of the lungs; Nephria, or Bright's disease, and all the *local* class of maladies, vie with the infectious and other zymotic disorders in wasting the health and destroying the life of the tenement population.

It is well known that New York has already exceeded every other city in the world in the dangerous art of packing the poor and ignorant upon the least possible area and with least ventilation. Not only are entire squares (containing four or four and a half acres each), now populated at the rate of more than 300,000 to the square mile, but in particular squares mentioned in the foregoing summary of tenement mortality, the inhabitants are packed upon whole squares at the rate of 732 to the acre or of only 6.61 square yards of area to each person. This is the case in

the four blocks in the rag-pickers' district on Sheriff and Willett streets, in a small class of old tenementry, while it was found that the population-density in a block on Second and Third streets [page], surveyed by Dr. Randall in November, was at the rate of 551,680 inhabitants to the square mile, or 862 to the acre, and 5.61 square yards to each person, exclusive of the street area.

But, in addition to the unsanitary effects of excessive crowding, there is such an utter neglect of ventilation and adequate means for daily scavenging and purification of the tenement-blocks, that they invite and perpetuate the most pernicious infections, and thus become sources of peril not only to their own inhabitants, but to the wealthier classes in their vicinity. They are perpetual fever nests, ready to nourish and force into deadly activity any *fomites* or contagium that may chance to find lodgment in them.*

Familiar as the Registrar had been with the sanitary wants of the crowded and uncleanly portions of the metropolis these eighteen years, he was scarcely ready to believe that so great an excess of mortality occurred in them as this special enquiry has now conclusively shown. And the readers of Mr. Norton's admirable analysis of these records will be as painfully surprised as that excellent observer has been, in the results of a close examination of this special class of statistics.

* The social or moral aspects of this subject of bad housing and unhealthy homes of the poorer classes, awells into such paramount importance when we come to consider the actual condition of the tenement-houses and *pauvres faubourgs* of the metropolis, that aside from the merely humane and physical questions these moral conditions are so vast and inevitable, that they alone inspire the sanitary officer, more than all other considerations, in his endeavors to improve the hygiene of the poorer classes; for, as Mr. Simon well said, when he was a local sanitary officer, in course of that unconscious training that has made him the most statesman-like and useful hygienist that ever held public office:

"It is well to remember that such physical and moral conditions could react on one another; that the local circumstances which are hostile to health are likewise hostile to moral and intellectual education. It has been my duty to make myself very intimately acquainted with places respecting which it may with truth be said, that vice, and ignorance and brutality are among their active causes of disease. But from my first moment of personal intimacy with such places till now, my assurance has grown stronger and stronger that it is much more difficult than the wealthy and powerful can imagine for those who are born and bred in courts, which are nurseries of cholera, typhus and scrofula, to emerge from their wretched childhood otherwise than vicious, ignorant and brutal. The same soil nurtures both, growths of misery. And when social reformers jointly address themselves to these affecting scenes, it is no easy problem to determine, whether by their indirect co-operation, the school master and the minister of religion do more for the bodily health, or the sanitary improver more for the progress of education and for the lessening of crime."

No less graphic and earnest are the words of Rev. Dr. Muhlenberg, the noble rector of St. Luke's Hospital, when, in alluding to the crowded homes of the city poor, he said: "Look at those quarters of your city where the people herd by fifties and by hundreds in a house, street after street. Look at them huddled together in narrow rooms, with surroundings and effluvia where a half hour's stay would sicken you. See places which might rather be stalls or sties than human abodes. Look at the swarms of children in the streets, on the stoops, at the windows, half-naked or in unwashed rags. See the crowds of rough, half-grown boys, in knots at the corners, quick at all sorts of wickedness, loud in foulness and blasphemy, the ready and the worst element of your riots."

While these records have been in progress, the Registrar has at different times personally visited and examined the chief centres of the excessive death-rates, and being deeply impressed with certain points that manifestly require attention in any comprehensive effort to reform the sources of insalubrity in them, he would respectfully submit a few leading facts which seem to demand the most immediate and practical consideration of all who are concerned, for the sanitary welfare of the city poor, and for the general protection of the public health.

First.—That such constant and numerous perils to the public health and to the lives of the overcrowded tenement populations are found in and about the tenement blocks, that there seems to be required a systematic and periodical sanitary inspection and report of them; and, therefore, that the tenement-houses of New York and Brooklyn need to be registered and kept under a methodical and exact plan of sanitary observation.

Second.—That a monthly (or more frequent) record of all the deaths in the tenement-houses of each sanitary inspection district, should be placed in the hands of the Sanitary Inspectors for information. Whenever there is any infectious, or epidemic disease prevailing, these reports can be furnished daily.

Third.—That the owners or lessees of tenement-houses, in all such cases as the Board of Health directs, and under such regulations as it shall establish, should provide a resident superintendent to preserve a thoroughly good sanitary condition of the premises.

THE SEVERAL CAUSES OF DEATH.

In the course of inquiries into the preventable conditions that are concerned in the several causes of death, the medical officers of this Bureau have in both cities laid some foundations for systematic studies, that must ere long become useful to sanitary science, and the officers of public health. It was designed to introduce some of the chief results of these beginnings of this class of duties. But the incompleteness of the inquiries, the desirableness of thorough and comprehensive researches, as well as the danger of too much haste in deductions, render it expedient to postpone for this year, the public presentation of any of the statistical and hygienic reviews that are now in progress in regard to particular diseases. Suffice it to say that a very careful investigation of the preventable conditions of grounds, domiciles and industrial occupation, under which pulmonary consumptions is found to originate and prevail among us, has become one of the leading subjects for observation and study. The Registrar would embrace this opportunity to represent to the Board of Health, that it seems to be not only practicable but really needful that this kind of sanitary inquiry should henceforth be regarded as an essential means for grasping some of the most destructive and subtle causes of disease; and therefore, that it is eminently important that such inquiry into the commonly unsuspected and unavowed, but really avoidable sources of premature decay and mortality, should be maintained as an essential work of the Board of Health.

In his two previous reports the Registrar has presented evidence showing the necessity for such inquiry into the preventable sources of Phthisis Pulmonalis and certain other inevitable destroyers of human life. And in the densely massed populations of the cities it is necessary to make vigilant search for whatever removable causes of disease can be found and restrained. It is one of the most promising facts characterizing the movements of the civilization and religion of our times that the sacredness of human life and the duty of protecting human health are more and more intelligently appreciated. Even the common laboring classes begin to welcome the sanitary adviser as the truest of benefactors. It is only the most degraded classes of society, on the one hand, or the most sordid of men, on the other hand, "who now resist every effort to lead them to purity of habit and habitation, and to give them wholesomeness of air, as a new interference with their liberty, * * * insisting on their right to helpless death," as Ruskin once wrote of the people he saw about him. The daily press and the teachers of religion do not hesitate to reiterate the life-saving doctrine of the preventability of certain kinds of premature death. Extensive intercourse with the people of New York and the entire Metropolitan District warrants us in the statement that the public intelligence and sentiment of citizens will fully sustain the Board of Health in the most thorough inquiries into all the great removable sources of premature death. The first inquiries have related extensively and in a very definite way to the great group of zymotic diseases.

The observations that we have recorded respecting these diseases in previous pages render further mention of them unnecessary except as regards the

CONTAGIOUS DISEASES.

The Sanitary Code at present enumerates eight diseases, each of which is recognized by medical men as being transportable by means of its own pestilential contagium. These are cholera, yellow fever, small pox, diphtheria, typhus or ship fever, typhoid fever, spotted fever or cerebro-spinal meningitis, and scarlet fever. The portability of all of these, except the seventh in the series, is conceded by all. They are "registered enemies" of life, and the special record which the Board of Health keeps of them and their movements in the two cities is an important means of protection to the public health. The natural laws that determined the prevalence of some of these diseases are not yet fully understood, and it seems probable that even cholera, an exotic from India, will have the secret of its pandemic contagium revealed and definitely described under the microscope long before scarlatina and diphtheria, the constantly present enemies of child life, can be brought to the last analysis of the specific causes by which they are perpetually propagated.*

In order to bring the chief of these child pestilences under ready and

* See Sanitary Code, section 19.

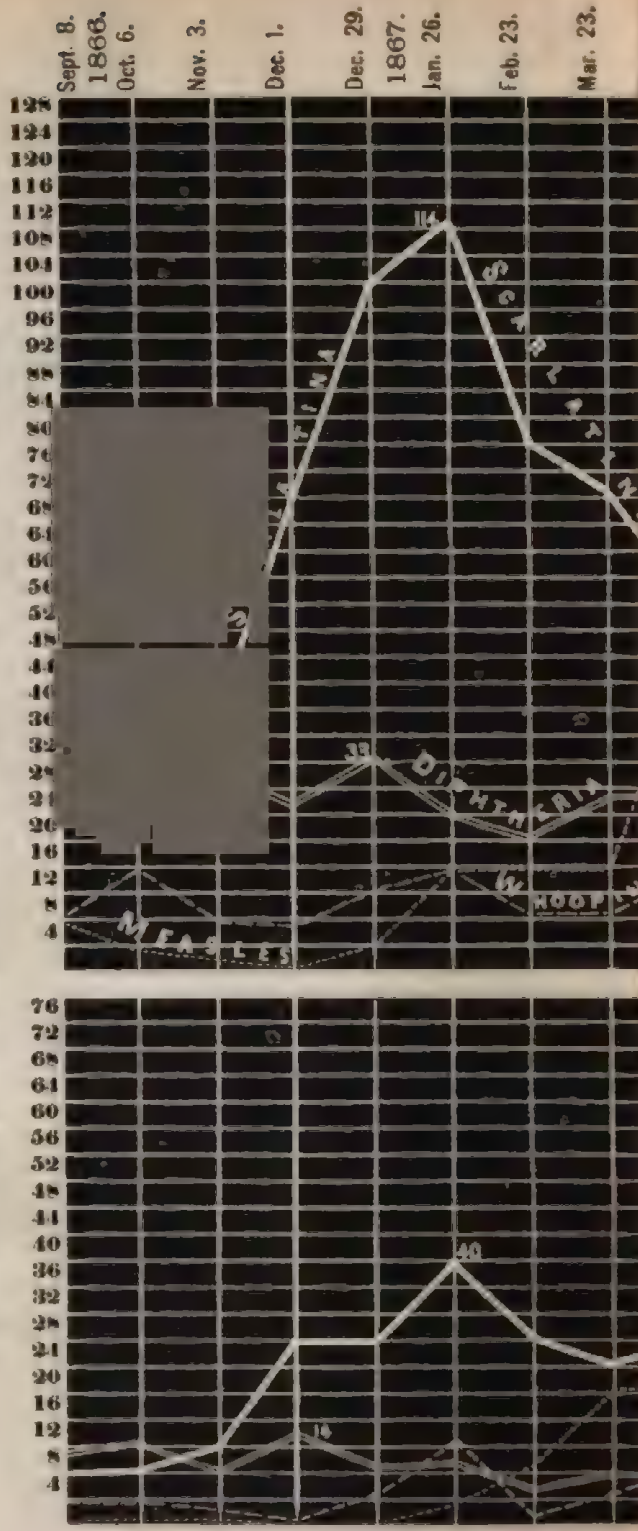


COURSE OF THE INFECTIOUS DISEASES OF CHILDREN,

FOR TWO YEARS AND THREE MONTHS.

Deaths in NEW YORK and BROOKLYN from Scarlatina, Diphtheria, Whooping Cough and Measles, in

Four Weeks' Periods, from September 8th, 1866, to December 26th, 1868, inclusive.



close observation as respects their synonymous movements with each other and in successive seasons, we here present a chart showing the course pursued by scarlatina, diphtheria, whooping cough, and measles, in New York and Brooklyn during the twenty-seven months ending December, 1868.

There is something hopeful and significant in the results which have in the past four or five years attended the researches of the medical mycologists or students of the fungus parasites in regard to the ferment or zymotic diseases. The notes on this subject in our last year's report correctly convey the view which epidemiologists now take of this intricate and progressive kind of knowledge. And it has been an unexpected duty of ours to enter quite largely and in a most practical way into this line of researches in connection with the study of the specific contagium of the so-called "Texas Cattle Disease" the past season. The report upon this disease embodies facts that may yet give much aid to the inquiry into the essential nature of certain deadly pestilences. To Prof. Ernst Hallier, of the University of Jena, the world is indebted for the most *definite* results which have been reached, and that now promise much practical aid to hygiene by the description and sanitary treatment of the fungus parasites of the worst of the pestilential diseases.*

INFANT MORTALITY.

The records of infant mortality demand something more than a merely statistical analysis. That so much young life should be nipped in the bud cannot be an irrevocable destiny, but we have to confront the fact as it is daily registered on the death roll, that in these cities more than thirty-two in every 100 deaths, are those of nurselings that have not reached their first birth-day, and that 52 out of every 100 deaths, are of children that have not reached their fifth birth-day.

Just what proportion of all this loss of infant life should be regarded as *inevitable* or really the necessary consequence of those organic and constitutional frailties, and those accidents that the tender young life of the human family is subject to, no deductions of the physiologist and hygienist can at

* The following list of the special contributions which Prof. Hallier has made to the kind of knowledge above referred to, may serve scientific readers of this report who desire to consult the highest authority on these questions.

The Cholera Contagium. Botanical Examinations for the Information of Physicians and Naturalists. Leipzig, 1867.

Parasitological Examinations in regard to the Plant—organisms of Measles, Typhus Fever, Typhoid Fever, Small-Pox, Cow-Pox, Sheep-Pox, Cholera Nostras, etc. Leipzig, 1868.

The Plant Parasites of the Human Body, for Physicians, Botanists and Students; also, as a guide in the study of the lower organisms. Leipzig, 1866.

Fermentation-phenomena. Examinations in regard to Fermentation, Decay and Putrefaction; with reference to Miasms and Contagions—also to Disinfection. Leipzig, 1867.

The studies of Dr. Klobe ("Pathologico-Anatomical Studies upon the Course of Cholera Processes. Leipzig, 1867"), and of Dr. Thomé ("Cylindrotanium Cholera Asiaticæ, Berlin, 1867"), are also interesting and strongly corroborative upon this most practical of sanitary inquiries.

present determine. Certain it is that nearly ten per cent of all children born in our cities are constitutionally and organically too frail and imperfect to survive the ordinary physical adversities through which they must pass during the first five years of existence. But there is another class of *inevitable* causes of child mortality which the vital statist and hygienist must carefully study:

It is that class which kills by cholera-infantum and bowel congestions in the summer, and by lung diseases and convulsions in the cold season.

Individually considered, most of these deaths seem to the medical attendant to be *inevitable*, but if we consider them with regard to their chief causes, they plainly appear to be due to *preventable* circumstances.

The true meaning, therefore, of the death-rates of infancy and early childhood is worthy of studious inquiry.

Summary of Total Mortality and Deaths in Infancy and Childhood, Together with Temperature, Observations by weeks during the Year 1868.

WEEK ENDING, 1868.	Total Mortality by weeks.	Mortality of Infants under one year of age.	Mortality of Children under five years of age.	Mean Temperature.	Greatest Range from to.	Average Humidity.	Total Rain Fall, inches.	Mean pressure of the Atmosphere.
(Eleven days) ending Jan. 11....	653	164	307	29	11-32	61	1.3	31.65
January 18.....	441	134	209	19	15-25	60	.25	30.02
25.....	444	124	195	28	22-34	71	1.15	29.00
February 1.....	379	100	173	23	16-32	72	1.	30.50
8.....	402	115	205	16	5-28	64	.39	30.11
15.....	448	124	213	23	14-33	64	.58	30.11
22.....	448	91	186	29	11-37	68	.24	29.95
29.....	437	132	209	20	3-31	64	.66	30.13
March 7.....	482	113	238	21	5-44	59	1.00	29.97
14.....	464	130	236	43	37-48	75	.50	30.10
21.....	412	124	198	41	27-52	76	.48	29.86
28.....	480	126	236	38	30-42	64	.005	29.90
April 4.....	463	121	213	45	35-55	67	.29	29.87
11.....	472	143	230	32	29-36	63	2.75	29.89
18.....	509	152	257	46	33-62	77	1.50	29.97
25.....	435	105	184	49	35-59	80	1.25	30.16
May 2.....	453	126	207	50	42-60	70	.48	30.01
9.....	432	104	176	51	46-58	74	1.39	29.77
16.....	440	121	197	55	50-60	70	2.19	29.99
23.....	407	115	184	56	51-63	86	3.40	29.79
30.....	408	110	188	61	50-66	84	.29	29.82
June 6.....	348	96	163	65	58-72	67	.14	30.11
13.....	392	107	179	64	54-71	82	3.40	30.03
20.....	387	107	189	73	70-82	74	.11	29.94
27.....	427	144	213	70	63-78	60	.6	30.00
July 4.....	413	147	235	80	76-87	66	.0	30.13
11.....	614	268	361	80	74-90	68	.4	30.03
18.....	1,142	519	705	88	80-94	60	.0	29.98
25.....	781	363	544	78	72-85	76	6.01	29.88
August 1.....	730	353	520	80	75-86	69	.30	30.00
8.....	751	363	538	78	72-86	74	5.50	29.97
15.....	643	291	438	74	63-79	55	.4	30.02
22.....	732	303	486	76	60-82	73	1.50	30.11
29.....	686	265	434	74	67-78	66	.10	30.13
September 5.....	599	228	375	76	65-85	72	6.68	30.03
12.....	569	217	357	74	70-83	76	.31	29.99
19.....	515	186	309	63	50-63	58	.04	30.16
26.....	454	156	255	60	52-69	79	4.00	29.99
October 3.....	472	155	241	58	55-64	69	.53	30.04
10.....	423	138	214	56	48-60	65	.30	30.04
17.....	424	144	213	55	41-65	55	.50	30.06
24.....	369	122	177	46	40-53	65	.70	30.16
31.....	380	112	171	48	41-54	63	.25	30.18
November 7.....	336	86	137	44	37-48	63	2.60	29.95
14.....	334	81	139	46	37-60	61	1.00	30.13
21.....	336	76	131	39	35-46	63	1.95	29.92
28.....	358	77	134	40	34-45	59	.70	29.90
December 5.....	350	63	138	32	28-40	63	1.1	29.82
12.....	324	88	146	28	22-35	60	1.2	29.80
19.....	385	103	173	29	20-38	63	.45	29.96
26.....	359	82	136	27	15-38	61	.19	29.98
Five days ending December 31....	367	101	151	32	27-35	70	.17	30.18

Climate, diet, domiciliary conditions of unhealthfulness, and most of all ignorance and improper care of the sanitary wants of infancy and childhood, are each in turn justly charged with its share in the enormous infant death-rates in New York and Brooklyn.

And if we bring all these factors of the fatal result down to the last ana-

lysis, it will not fail to appear that the last mentioned in this category are the chief.

Of course it would be utter folly in the present advanced state of physiological and sanitary knowledge to charge upon any one separate cause or physical circumstance all this slaughter of the innocents.

The composite and factor-like nature of the causes that bring about the fatal results must be studiously sought out, and then whatever can be removed or prevented by sanitary authority will offer new hope in the endeavor to reduce the death-rates.

In plain view of these cities, and within the limits of the Metropolitan District, there are neighborhoods of families that lose scarcely one-third as large a proportion of their children in the first five years of life as we bury from our city tenement houses. Dr. Wm. T. Gairdner, the chief medical officer of Glasgow, Scotland, has placed this class of facts in a strong light in the following statement, derived from inquiries in which he was aided by several medical friends in country and in city parishes:

Chance of Life for Infants in the First Year from Birth in Town and Country, and among Different Classes.*

	Born.	Died under one year.	Per cent.
District (a) (country)	277	11	3.97
District (b) (country)	288	22	7.64
District (c) (country)	267	23	8.61
District (d) (country)	257	32	12.5
Legitimate children	997	73	7.32
Illegitimate children	92	15	16.30
Farmers' children	100	7	7
Laborers' children	115	16	13.9

Plainly enough, it is not the atmospheric temperature and humidity alone that make such differences in the infant death-rates in the same district of country. But that high temperature and excessive moisture, coöperating with local causes of atmospheric impurity, whether that impurity be within the domicile or in fens and out-door slums, produce excessive mortality among infants, is a well ascertained fact.

In the course of correspondence with Dr. Henry Lombard, a very distinguished hygienist of Geneva, Switzerland, he has adduced for our consideration some exceedingly important facts relating to the geographical and atmospheric conditions that are found associated with excessive infantine death-rates in various countries of Europe.

He has stated to us that our summer mortality of infants in New York seems to follow very much the same course as that which is experienced by the cities on the Mediterranean border of Southern Europe. In examining this subject we have been much impressed with the facts elicited in the comparison of the infantine death-rates of those cities with those of New York. The following tables present some of those points of comparison:

* District (a) has a population of shepherds and farmers. District (b) has a population of farmers and gentry. District (c) has a population of laborers in mills and collieries. District (d) has a population of weavers, farmers and colliers.

Deaths in the City of New York of Persons of 90 Years and upwards for the Nine Months ending September 30, 1868.

NAME.	Age.		Nativity.	Occupation.	Color.	Date of Death.	REMARKS.		Cause of Deaths.
	Yrs.	Mos. Days					Yrs. in U. S.	Married or Widowed.	
Mary Sherman.....	90	12	United States.....	.....	White.....	Feb. 19.	Life.....	Widow.....	Old Age.
Catharine Roach.....	90	5	Ireland.....	.....	White.....	Mar. 28.	14 years.....	Widow.....	Bronchitis (Old Age).
Catharine Leonard.....	90	6	United States.....	.....	White.....	Aug. 20.	Life.....	Single.....	Old Age (Inanition).
Charlotte Blake.....	90	2	Bermuda, W. I. ....	.....	Black.....	Feb. 1.	75 years.....	Widow.....	Old Age.
Sarah Duxton.....	90	3	United States.....	Housekeeper	White.....	Aug. 7.	Life.....	Widow.....	Old Age.
Ellen Maloy.....	90	3	Ireland.....	.....	White.....	Aug. 4.	16 years.....	Widow.....	Hemorrhage of Lungs (Phthisis).
Ann Salsburg.....	90	.....	United States.....	.....	Black.....	Aug. 30.	Life.....	Single.....	Old Age.
Richard Shiels.....	90	.....	Ireland.....	.....	White.....	Jan. 12.	20 years.....	Widow.....	Old Age.
Bridget Neighan.....	90	.....	Ireland.....	.....	White.....	Jan. 26.	15 years.....	Widow.....	Old Age.
Lydia Hall.....	90	.....	United States.....	.....	White.....	July 1.	Life.....	Widow.....	Cancer of the Breast.
Mary Prindle.....	90	1	United States.....	.....	White.....	Aug. 25.	Life.....	Widow.....	Old Age.
Joseph Henriques.....	90	5	West Indies.....	.....	White.....	Mar. 9.	48 years.....	Widow.....	Old Age.
Johanna Morris.....	90	6	Ireland.....	.....	White.....	Jan. 30.	17 years.....	Widow.....	Paralysis (Old Age).
Henry Badeau.....	90	1	United States.....	Merchant.....	White.....	July 18.	Life.....	Married.....	Senile strangene.
Patrick Mulligan.....	91	.....	Ireland.....	.....	White.....	Sept. 19.	28 years.....	Married.....	Senile strangene.
Elizabeth Gladwin.....	91	.....	United States.....	.....	White.....	Aug. 25.	Life.....	Widow.....	Chronic Bronchitis (Phthisis).
Ann Pendleton.....	91	.....	United States.....	.....	White.....	Sept. 14.	Life.....	Widow.....	Old Age.
Clara Johnson.....	91	.....	United States.....	.....	Black.....	Mar. 13.	Life.....	Widow.....	Old Age (Diarrhoea).
Elizabeth Mapes.....	91	.....	United States.....	Cook.....	White.....	Mar. 6.	Life.....	Widow.....	Old Age.
Jeremiah Sherwood.....	91	13	United States.....	Cartman.....	White.....	June 21.	Life.....	Widow.....	Old Age.
Eliza Turner.....	92	.....	United States.....	.....	White.....	Mar. 3.	Life.....	Single.....	Pneumonia.
Maria Montgomery.....	92	5	United States.....	.....	White.....	Mar. 1.	Life.....	Single.....	Old Age.
Nancy Green.....	92	.....	United States.....	.....	White.....	Mar. 3.	Life.....	Single.....	Old Age (Marasmus, Exhaustion).
Elizabeth Ginn.....	92	.....	Ireland.....	.....	Black.....	Apr. 23.	Life.....	.....	Cancer of Stomach.
Clara Kettleman.....	92	.....	Germany.....	Housekeeper	White.....	Apr. 9.	6 years.....	Married.....	Congestion of the Lungs.
Ruth Skinner.....	93	.....	England.....	.....	White.....	May 11.	20 years.....	Widow.....	Old Age (Pneumonia, Dropsy).
James Clark.....	93	4	Ireland.....	Shoemaker.....	White.....	Aug. 2.	40 years.....	Widow.....	Old Age.
Abigail Williams.....	93	.....	Ireland.....	.....	White.....	Aug. 19.	18 years.....	Married.....	Old Age.
John Maloney.....	94	1	United States.....	.....	White.....	June 13.	Life.....	Widow.....	Phthisis Pulmonalis.
Bridget Campbell.....	95	.....	Ireland.....	Laborer.....	White.....	Apr. 19.	6 years.....	Married.....	Old Age.
Margaret Gillespie.....	96	10	Ireland.....	.....	White.....	Jan. 31.	17 years.....	Single.....	Old Age.
Thomas Farrell.....	97	5	Ireland.....	.....	White.....	June 28.	73 years.....	Married.....	Old Age (Edema of Lungs).
Margaret Conghlin.....	97	.....	Ireland.....	.....	White.....	Feb. 29.	22 years.....	Widow.....	Old Age.
Michael Nugent.....	98	.....	Ireland.....	.....	White.....	Apr. 20.	20 years.....	Widow.....	Old Age (Bronchitis).
Margaret Terry.....	100	.....	Ireland.....	Laborer.....	White.....	Mar. 4.	27 years.....	Widow.....	Diarrhoea.
Maria M. Pesinger.....	100	6	Ireland.....	.....	White.....	June 12.	13 years.....	Widow.....	Old Age.
Ann Mary Brown.....	103	11	United States.....	.....	White.....	Feb. 29.	Life.....	Widow.....	Old Age (Debility).
Honora Hanlon.....	108	.....	Ireland.....	.....	White.....	July 3.	Life.....	Widow.....	Old Age (Tumor of the Breast).
					White.....	Apr. 26.	28 years.....	Widow.....	Old Age.

Percentages of Mortality in Children (at different Seasons of the Year) under Five Years of Age.

	Grosseto.	Naples.	Cagliari.	Palermo.	The Average in these four cities.	New York.
Winter	23.87	24.07	19.82	23.00	22.64	22.53
Spring.....	20.14	23.60	17.48	19.84	20.26	22.94
Summer	34.25	31.69	31.76	32.68	32.34	31.76
Autumn	22.24	29.64	30.94	24.28	24.53	21.97
	100.00	100.00	100.00	100.00	100.00	100.00
Four cold months ...	29.23	32.45	26.54	30.06	29.84	29.97
Four warm months ..	42.74	39.55	43.59	41.18	41.84	47.77

DEATHS IN EXTREME OLD AGE.

The death registers for 1867 contain the names of five persons who were more than one hundred years of age at the time of death. One of these, Christina Renfort, a native of France, died at the Nursery Hospital, Ward's Island, December 18, 1867. Her name does not appear in the tabular statement of deaths of centenarians in the last annual report of the Bureau of Vital Statistics, for the reason that the report was closed before her death was registered.

Christina Renfort was born in France in the year 1762, and was consequently 105 years old when her life terminated. She had been an inmate of the Nursery Hospital, on Ward's Island, 26 years, having been admitted a short time after landing in this country. She is said to have been a very smart old woman, cleanly in her habits and an excellent worker. She acquired our language with great difficulty, and at the time of her death could speak very little English. On one occasion she was sick for about three weeks, and her recovery was considered doubtful. She afterwards rallied and fully recovered. Her final illness lasted only three days, and death was the result of exhaustion and old age.

The same register bears the name of Thomas Wiley, a native of New York, who died December 23, 1867, at the advanced age of 91 years and 11 months. Mr. Wiley was born on Broadway, two doors below Wall street, January 23, 1776. His father was an ardent patriot during the Revolutionary war; and on the arrival of the messenger from Philadelphia with a copy of the Declaration of Independence, he was escorted to Mr. Wiley's residence. A chair, now an heir-loom in the Wiley family, was brought to the front of the house, and from it the immortal declaration was read for the first time in the city of New York. Thomas Wiley, the deceased, was present in his mother's arms upon that occasion. He voted at every Presidential election from the time of his majority until his death. His health was excellent throughout his entire life, and he was out in a severe storm only three days previous to his death.

Deaths in the City of New York of Persons of 90 Years and upwards for the Nine Months ending September 30, 1868.

NAME.	AGE.		Nativity.	Occupation.	Color.	Date of Death.	REMARKS.		Cause of Deaths.
	Yrs.	Mos Days					Yrs. in U. S.	Married or Widowed.	
Mary Sherman.....	90	12	United States	.....	White.	Feb. 19.	Life	Widow	Old Age.
Catharine Knoch.....	90	5	Ireland	.....	White.	Mar. 28.	14 years	Widow	Branchitis (Old Age).
Catharine Leonard.....	90	6	United States	.....	White.	Aug. 20.	Life	Single	Old Age (Inanition).
Charlotte Blake.....	90	2	Bermuda, W. I.	.....	Black.	Feb. 1.	75 years	Widow	Old Age.
Sarah Dugan.....	90	2	United States	.....	White.	Aug. 7.	Life	.....	Old Age.
Ellen Maloy.....	90	3	Ireland	Housekeeper	White.	Aug. 4.	16 years	Widow	Hemorrhage of Lungs (Phthisis).
Ann Salsburg.....	90	.....	United States	.....	Black.	Aug. 30.	Life	Single	Old Age.
Richard Shiels.....	90	.....	Ireland	.....	White.	Jan. 12.	20 years	.....	Old Age.
Bridget Neighan.....	90	.....	Ireland	.....	White.	Jan. 20.	15 years	Widow	Old Age.
Lydia Hall.....	90	.....	United States	.....	White.	July 1.	Life	Widow	Cancer of the Breast.
Mary Prindle.....	90	1	United States	.....	White.	Aug. 25.	Life	Widow	Old Age.
Joseph Henriques.....	90	5	West Indies.	.....	White.	Mar. 9.	48 years	Widow	Old Age.
Johanna Morris.....	90	.....	Ireland	.....	White.	Jan. 30.	17 years	Widow	Paralysis (Old Age).
Henry Bndeen.....	90	6	United States	Merchant	White.	July 18.	Life	Married	Senile Gangrene.
Patrick Mulligan.....	91	.....	Ireland	Labourer	White.	Sept. 19.	28 years	.....	Chronic Bronchitis (Phthisis).
Elizabeth Gladwin.....	91	.....	United States	.....	White.	Aug. 25.	Life	Widow	Old Age.
Ann Pendleton.....	91	.....	United States	.....	White.	Sept. 14.	Life	Widow	Old Age (Diarrhoea).
Clara Johnson.....	91	.....	United States	Cook	Black.	Mar. 13.	Life	Widow	Old Age.
Elizabeth Mapes.....	91	.....	United States	.....	White.	June 6.	Life	Widow	Old Age.
Jeremiah Sherwood.....	91	13	United States	Cartman	White.	Mar. 21.	Life	Widow	Old Age.
Eliza Turner.....	92	.....	United States	.....	White.	Mar. 3.	Life	.....	Pneumonia.
Maria Montgomery.....	92	5	United States	.....	White.	Mar. 1.	Life	Single	Old Age.
Nancy Green.....	92	.....	United States	.....	Black.	Apr. 23.	Life	Widow	Old Age (Marasmus, Exhaustion).
Elizabeth Glen.....	92	.....	Ireland	Housekeeper	White.	Apr. 9.	64 years	Widow	Cancer of Stomach.
Clara Kettleman.....	92	.....	Germany	.....	White.	May 11.	20 years	Widow	Congestion of the Lungs.
Ruth Skinner.....	93	4	England	.....	White.	Aug. 2.	40 years	Widow	Old Age (Pneumonia, Dropsy).
James Clark.....	93	.....	Ireland	Shoemaker	White.	Aug. 10.	18 years	Married	Old Age.
Abigail Williams.....	93	.....	United States	.....	White.	June 13.	Life	.....	Old Age.
John Maloney.....	94	1	Ireland	Labourer	White.	Apr. 19.	6 years	Widow	Phthisis Pulmonalis.
Bridget Campbell.....	95	.....	Ireland	.....	White.	Jan. 31.	17 years	Married	Old Age.
Margaret Gillespie.....	96	10	Ireland	.....	White.	June 28.	73 years	Single	Old Age.
Thomas Farrell.....	97	5	Ireland	.....	White.	Feb. 29.	22 years	Married	Old Age (Edema of Lungs).
Margaret Coughlin.....	97	.....	Ireland	.....	White.	Apr. 20.	20 years	Widow	Old Age (Bronchitis).
Michael Nugent.....	98	.....	Ireland	Labourer	White.	Mar. 4.	27 years	Widow	Diarrhoea.
Margaret Terry.....	100	.....	Ireland	.....	White.	June 12.	13 years	Widow	Old Age.
Maria M. Fessinger.....	100	6	United States	.....	White.	Feb. 29.	Life	Widow	Old Age (Debility).
Ann Mary Brown.....	103	.....	United States	.....	Black.	July 3.	Life	Widow	Old Age (Tumor of the Breast).
Honora Hanlon.....	108	.....	Ireland	.....	White.	Apr. 26.	28 years	Widow	Old Age.

The tabulated statement of deaths in extreme old age for the year 1868 contains thirty-eight names. Of these deaths twenty-nine were women, four of whom had lived more than a century. One of the number, Honora Hanlon, had reached the extraordinary age of 108 years. She was a native of Ireland, and had been in this country 28 years. Her husband died five years previous to her death.

On the 13th of March Michael Healy died at Hunter's Point, aged 94 years, 3 months and 8 days. Dr. C. S. Whitehead, who attended him in his final illness, writes the following account of this remarkable man:

"Healy was born in Ireland, and owned his land, which he cultivated till he came to this country at the age of 94 years. He had five children, who were all here before him. His wife died at this place aged 61 years. His daughter informs me he was never sick in his life. He never smoked or used tobacco in any shape. I have known him about eight years, and it was extraordinary to see the activity of this aged man. His eyesight was perfect to the last, and his teeth were in splendid condition. He was a moderate drinker. I never knew him to be drunk. He always cut all the wood that was required for the house, and the Monday before his death cut the wood as usual. He resided with his daughter, and lived in decent circumstances. He had one son in the army, and when discharged at the end of the war, this son was rather reckless, and about three or four months ago was drowned in the canal at this place. This preyed upon the old man, and, I think, hastened his end. Six months ago he could walk the streets as smart as I can now. Three years ago he was rather deaf, but about one year before his death his hearing was restored."

A certain degree of interest is always centered about those persons who live so far beyond the average age of mankind, and it is to be regretted that the data for a study of the causes of longevity are so meager. To stand on the brink of the grave and look back over a century of the world's history is an event that happens to very few of the vast multitude who pass the bridge which connects the eternity of the past with the eternity of the future. Nature, never lavish of her gifts to individuals, bestows those which produce this result with a very sparing hand, and in accordance with laws which physiology and hygiene must interpret.

Abstract of the Record of Deaths by Pathologic Phenomena, in the City of New York, in the Twelve Months ending December 31st, 1896.

SHOWING AGES, SEXES, NATIVITY AND CLASSES OF OCCUPATIONS; ALSO THE MONTHS AND THE WARDS IN WHICH THESE DEATHS OCCURRED.

STATISTICS RELATING TO THE TOTAL OF THIS MORTALITY BY AGES AND SEXES.				DEATHS IN THE DIFFERENT MONTHS, AND THE NATIVITIES.				STATISTICS RELATING TO ACCLIMATIZATION, OCCUPATIONS, MORTALITY IN HOSPITALS				DEATHS IN WARDS.														
Ages.	Male.	Female.	Total.	Months.	Male.	Female.	Total.	Residence in Country.	Male.	Female.	Total.	Wards.	Total.													
Under 1 year.....	31	11	33	January.....	130	154	319	Less than five years	104	146	310	1st Ward	86													
1 to 2 years.....	34	22	56	February.....	173	199	394	Five to ten years	140	131	271	2d Ward	9													
2 to 3 years.....	12	16	28	March.....	904	170	373	Ten years and upwards	438	438	1,000	3d Ward	0													
3 to 4 years.....	6	6	11	April.....	171	178	349	Total	1,192	1,011	1,000	4th Ward	0													
4 to 5 years.....	6	4	10	May.....	150	139	305	Occupations.	Estimated men (professional).....	118	118	5th Ward	76													
5 to 10 years.....	18	23	41	June.....	144	140	305					Merchants.....	71													
10 to 15 years.....	10	32	41	July.....	171	115	305					Clerks.....	30													
15 to 20 years.....	70	95	175	August.....	122	119	311					Traders.....	30													
20 to 25 years.....	222	248	470	September.....	140	178	324					Bakers.....	54													
25 to 30 years.....	258	248	506	October.....	175	119	305					Laundresses.....	964													
30 to 35 years.....	242	195	438	November.....	180	113	303					Male servants.....	319													
35 to 40 years.....	177	134	305	December.....	166	135	303					Female servants.....	479													
40 to 45 years.....	172	104	262	Grand total.....	1,613	1,602	3,415					Practical occupations, etc.....	9,016													
45 to 50 years.....	101	104	205	Nativities.	Male.	Female.	Total.					Grand total.....	11,915													
50 to 55 years.....	101	69	176									Hospitals.	Bellevue Hospital.....	111												
55 to 60 years.....	57	65	122												Other Hospitals.....	430										
60 to 65 years.....	73	54	127					Total.....	540																	
65 to 70 years.....	51	47	98							Grand total.....	3,415															
70 to 75 years.....	21	35	56														Grand total.....	3,415								
75 to 80 years.....	19	7	26																Grand total.....	3,415						
80 to 85 years.....	5	0	5																		Grand total.....	3,415				
85 to 90 years.....	2	1	3																				Grand total.....	3,415		
90 to 95 years.....	2	1	3																						Grand total.....	3,415
95 to 100 years.....	2	1	3																							
Grand total.....	1,612	1,602	3,415	Grand total.....	3,415																					

Percentage of the Chief Pulmonary Diseases upon the Total Number of Deaths by all Causes.

NEW YORK.

	Phthisis.	Congestion of lungs.	Bronchitis.	Pneumonia.	Total number of deaths in the period by all causes.
In the twelve months ending Oct., 1868..	13.80	1.21	8.28	6.41	25,459
In the three months ending Mar., 1868..	16.61	1.49	4.69	8.97	5,953

PHTHISIS PULMONALIS.

The statistics of this disease in the cities of New York and Brooklyn during the year 1868, show that 3,414 deaths in the former and 1,335 in the latter city were charged to it. This is equal to 13.72 per cent of the total mortality by all causes in New York, and to 14.84 per cent of the total in Brooklyn. We have reason to believe that the good degree of accuracy which characterizes the medical certificates of the causes of death in these cities, warrants us in taking these as the present standard rates of deaths by pulmonary consumption in these two cities. It will be observed that this difference in the share which consumption had in the total mortality in each city, does not show a greater prevalence of this malady in Brooklyn than in New York, for the death-rate is so much lower in the latter than in the former city that there are actually fewer cases of consumption to every 1,000 of the population in Brooklyn than in New York.

Inquiries relating to the industrial occupations and domestic circumstances of those who die of this disease need to be instituted in a systematic way in both our cities. But anticipating that the time for thorough and permanent endeavors of this kind would soon come, if the Boards' system of district sanitary inspection should be able to cover that portion of the inquiry which relates to the tenements and workshops, the Registrar undertook, with Dr. Stiles, to press forward the special branch of inquiry relating to damp grounds and wet cellars as promotive of tuberculosis and impaired health. The scope of this inquiry was briefly mentioned in the report for 1867. We are now able to state that this wonderfully interesting branch of sanitary investigation—a practical study in medical topography as connected with the causation of disease—is now thoroughly organized, and already begins to yield results of vast practical import. This is a branch of medical inquiry, upon which the whole staff of Sanitary Inspectors will undoubtedly become co-workers. It is yet too soon to venture upon generalizations, but the facts already ascertained fully warrant all that we said upon this subject in our last year's report, and they are in every way confirmatory and illustrative of the chief practical deductions which were announced by Dr. Henry I. Bowditch concerning the local causes of pulmonary consumption in Massachusetts.

In our last year's report we took occasion to quote the conclusions which had been unexpectedly reached in the digest of the sanitary experience of twenty-five towns in England that had received the benefits of thorough drainage and drying of the grounds on which they are built. Those searching inquiries into the statistical evidence of definite results of sanitary drainage and improvements, have been continued during the past year under the direction of Dr. Simon, the chief medical officer of the Privy Council, and that masterly hygienist sums up the general result in the following plain words:—*"The whole of the conclusions combine into one—which may now be affirmed generally, not only of particular districts—that WETNESS OF THE SOIL is a cause of phthisis to the population living upon it."**

It is not in the power of language to express any sanitary truth more plainly than this, but it is a truth that was virtually unknown until the

* In his Tenth Annual Report, Dr. Simon repeats and enlarges the testimony which he has obtained to the fact that "*wetness of soil is an important cause of phthisis to the population living upon the soil,*" (as he tersely states,) and he goes on to say that in former reports "I have brought into relief the industrial relations of the disease, and now I insist on its occasional endemic relations. On those previous occasions it was shown to be a disease which undergoes development in proportion as men are unwholesomely gathered in in-door industries, now it is shown to be a disease which also develops itself in proportion as men are dwelling upon a humid soil. These two conditions are very great etiological fragments; but even when taken together they do not pretend to exhaust, or nearly to exhaust, the subject of the causation of phthisis."

The fact that the thorough drainage and drying of the soil, in towns which once were afflicted by the excessive prevalence and fatality of tubercular phthisis, are now succeeded by a steady and very great diminution of this disease, is indisputably established; and this happy discovery, which, as regards the earliest well-stated indication of it, was first suggested by Dr. Bowditch, but as regards the absolute proofs from experience in the improved towns and cities, was first made known by Dr. Simon, and his able co-laborer, Dr. Buchanan—at once gives to sanitary science and to mankind, the definite control that was needed over one of the chief factors that enter into the complex causation of tubercular phthisis. Hygienists now can measurably restrain and prevent the generation of this disease, which in our Northern and Middle States prematurely destroys from twenty to thirty-five per cent of all persons who pass the age of childhood, or from twelve to eighteen per cent of the total at all ages; for at least four of its factors of causation are now recognised in the list of avoidable conditions, to wit: (1.) Wetness of grounds and of habitation; (2.) Impurity of air and unwholesomeness of circumstances in in-door life; (3.) Defective sunlighting of dwellings; (4.) Needless exposure of non-consumptive persons to the consumptive in unventilated places; avoidance of the contagious element in phthisis and of the circumstances that render its contagious property operative. Even the hereditary constitutional perpetuating property of tuberculosis may year by year, and generation after generation, be diminished in the extent of its operation, for hygienic considerations should, and in a higher civilization will favorably influence intelligent men in the selection of wives who are to be the mothers of their children: yet this may be the last in the series of preventive measures against phthisis; and, like the physiological requirements of hygienic alimentation, exercise and sunlighting, the applications of hygiene to the hereditary improvement of the quality of our race will be attained only in a higher state of the popular intelligence. It must, therefore, be regarded as a most important fact, that a diminution of phthisis, equal to from one-fifth to one-half its former percentage in the total list of deaths, can be prevented by thorough drainage and drying of the grounds in towns and villages, as Mr. Simon, the English medical officer, has shown to have been actually accomplished in Great Britain.

inquiries to which we have here referred, brought it forth from that arcana of blessings which hygiene has in rich reserve for mankind.

Ward and sub-district maps, which Dr. Stiles has already nearly completed for the study of consumption, as charts of mortality for the past ten years present conclusive evidence in favor of this doctrine of consumption breeding-grounds. The brief statement which that studious medical officer has made upon this subject for his branch of this Bureau's report should be pondered by the citizens of Brooklyn, and of every damp and undrained region within the Metropolitan District. The knowledge which is being acquired upon this most practical sanitary question promises great benefits to our fellow beings. Various, abundant and, in a certain sense, inevitable as the most commonly observed causes of pulmonary tuberculosis, are the discovery and statistical demonstrations that this destroyer is deprived of at least one-fourth part of its accustomed harvest of deaths simply by means of thorough drainage and drying of the grounds about dwelling houses and in particular districts, certainly is one of the grandest triumphs of hygiene; and such truths may well interest all classes of our fellow citizens.

SCARLATINA.

Cholera had scarcely ceased its prevalence in the autumn of 1866 when Scarlatina began to rage in various portions of the city of New York. It seemed to reach a maximum in the four weeks ending January 28th, 1867. But in the spring of 1868 it reached a much higher maximum, both in New York and Brooklyn. The relations which Scarlatina sustained to the temperature, or rather to the seasons, appears to have been important, for in the two successive winters of 1867 and 1868 its *epidemic* prevalence was most noticeable. Yet, in Brooklyn, in the month of July, 1867, the fact was noticed that the maximum of this disease in that year was reached—sixty-seven children having perished by it in the four weeks that ended on the 15th of July.

In the crowded tenement districts in the city of New York there has been much evidence that the contagious principle of scarlet fever is propagated with greater facility, and with more fatal force in the cold than in the warm seasons. The close, pent-up atmosphere of the tenement houses is an aid to the ready propagation of any zymotic poison. But in addition to this fact, it may be that there is another, scarcely less important, concerning the excessive prevalence of Scarlatina during the winter-time. Like the virus of typhus and of small-pox, that of Scarlatina seems to be best preserved in full activity in cold weather.

To show the statistical relations of the great foes of childhood, which, by virtue of their contagious character, have justly been termed by Dr. Robert Druet domestic pestilences, the preceding chart and the following abstract, showing their course for the past twenty-seven months, may be consulted:

Deaths in New York and Brooklyn from Measles, Scarlatina, Diphtheria and Whooping-Cough, during the twenty-seven Months ending December 26th, 1868.

FOUR WEEKS ENDING.	NEW YORK.				BROOKLYN.			
	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.	Measles.	Scarlatina.	Diphtheria.	Whooping Cough.
1866.								
October 6.....	3	33	22	16	1	9	13	4
November 3.....	1	39	31	8	1	12	8	2
December 1.....	75	26	7	.....	28	14	1	1
December 29.....	4	104	33	13	28	9	6	6
1867.								
January 26.....	15	114	25	15	3	41	10	13
February 23.....	16	80	21	9	9	29	6	2
March 22.....	16	73	27	9	19	24	9	5
April 20.....	46	57	27	15	21	28	8	9
May 18.....	69	71	16	10	32	28	6	6
June 15.....	74	55	20	14	10	41	2	4
July 13.....	99	49	10	2	26	61	3	8
August 10.....	86	30	17	15	21	28	8	15
September 7.....	30	25	28	20	11	21	6	21
October 5.....	9	10	18	15	5	11	5	21
November 2.....	6	15	15	19	9	15	12	11
November 30.....	12	23	14	11	20	45	15	13
December 28.....	25	51	26	10	26	33	14	6
1868.								
January 25.....	32	50	23	8	13	64	15	8
February 22.....	27	101	33	10	4	73	15	11
March 21.....	19	117	23	9	5	78	10	8
April 18.....	16	130	30	16	2	56	5	8
May 16.....	16	120	30	5	2	43	8	8
June 13.....	19	98	22	9	2	36	8	12
July 11.....	21	81	21	20	1	25	2	10
August 8.....	21	46	14	21	1	13	5	15
September 5.....	13	19	15	35	.....	10	10	25
October 3.....	7	19	8	27	1	10	12	25
October 31.....	2	20	17	21	1	13	24	27
November 28.....	1	27	9	8	.....	24	10	18
December 26.....	7	25	24	16	.....	38	9	8
Total	712	1,757	643	422	255	965	281	339

Though the local and the atmospheric conditions under which Scarlatina becomes epidemic are still mysteriously uncertain, the fact no longer admits of doubt that the contagious property of this disease can be controlled and destroyed when it exists in contaminated clothing, or in the atmosphere of domestic apartments; and experience during the twenty-seven months of the epidemic phenomena of Scarlatina in New York and Brooklyn clearly points to the probability that careful sanitary researches will prove that, in a large way, taking the experience of cities and villages, the contagious virulence and epidemic ravages of this foe of childhood will be found in greatest force where local moisture and impurities about the dwelling and neighborhood are greatest—in other words, where general unhygienic conditions prevail.

Upon this subject, the final conclusion which was reached by the Army Sanitary Committee, under the British government, in regard to the recent

epidemic of Searlatina in the Aldershot Camp is suggestive of truths which should be understood alike by families and by sanitary authorities.

That crowded camp gave quarters to 11,000 persons, of which 1,762 were children. Searlatina swept through their quarters and destroyed twenty-eight lives in a single season, and this was the final conclusion and recommendation given by the British Army Sanitary Committee :

"When scarlet fever or any other epidemic disease actually prevails among the children, immediate removal of the sick from among those unattacked ; spreading the families over a large superficial area ; camping out when the season admits of it, and rigid attention to cleansing and ventilation, as have been carried out at Aldershot during the late epidemic, are the best remedial measures which can be adopted for arresting the spread of the disease, but they are not a substitute for healthy dwellings."—(*Report on the late epidemic of scarlet fever among children in Aldershot Camp.*)

CERTIFICATES OF DEATH.

The records of mortality are by no means so complete and precise in any part of the world as they should be.

First—They are defective as regards accuracy in the statement of the causes of death. Some illustrations of this defect shall presently be given.

Second—There has hitherto been great want of uniformity in the names and the intended significance of names which different physicians give to the causes of death.

Third—The error of certifying merely the mode of dying, or some prominent and simply obvious symptom which chanced to attend upon the fatal stage of a disease or an injury, instead of stating the actual disease and the essential causes that terminated the life of the patient.

Fourth—The failure of some physicians, even some who are thoroughly educated, to employ the nomenclature which the most advanced and accurate state of pathology and the latest knowledge of the causation of particular diseases requires.

These facts are mentioned in this place because they must not be overlooked, but facts warrant the statement that in no city or county are the official returns of the causes of death characterized by greater accuracy and completeness than in the cities of New York and Brooklyn. And as regards the certificates of death which are rendered by the leading practitioners of medicine and surgery in these two cities, they are, with few exceptions, as faultless, and the causes of death are as definitely and clearly stated as the present state of medical science could justify us in requesting. The fact must here be stated also that not far from one-half of all the certificates of death which are given for patients out of public hospitals are written by men who are not well educated physicians, yet who under the very faulty laws of the State "practice Physic." The certificates of death which are furnished by this class of practitioners are under daily inspection and revision by the proper officers under the Board of

Health, and great numbers of them are daily corrected by means of direct questions and answers.

It is believed that the causes of death as registered the past two years, and more especially the last year, are sufficiently accurate to serve the purposes of exact records of death as a branch of accurate statistics.

In Great Britain, as we are informed by Dr. Wm. Farr, of the Registrar General's office, only eighty-three in 100 deaths are certified by physicians, and that in no less than twenty-five per cent of the whole number of deaths recorded, there is no authentic statement of the cause. In the city of Paris there is a class of public officers known as Verifying Physicians (*Médecins Vérificateurs*), who are required to attest the fact of death, the nature and name of the fatal malady, its causes and its complications, also its duration and the name of the physician who attended upon the patient. The fact of the death of any person in that city has to be certified by two witnesses.

In Prussia, and throughout the German States generally, while very close police surveillance is maintained in regard to the identity of the dead and the place and circumstances of death, and in regard to the age, civil condition and creed of the deceased, a medical certificate of the actual cause of death is rarely given. In some of the States, as in Hanover, for example, and in other states of Northern Germany, the parish clergyman is required to report the *manner* of death (*Todesart*). Dr. Rumsey, the great English expert in State Medicine, informs us that in Baden, for example, "a critical medical inspection and report is enjoined in every case, and a copy of the record is recorded in the town or parish; and, at the close of the year, a copy of this register is forwarded to the '*Bezirk-Staatsarzt*.'"

In Austria, a system of civil and vital registration requires that every death must be reported to the municipal or local magistrate, who sends the corpse-viewer (*Toden Beschauer*), an educated physician, who inspects the deceased person, and who must give a certificate of the true cause of death as correctly as he can ascertain it from the attending physician or from the surviving friends.

In Italy, a similar system to the Austrian prevails; but throughout Europe the death registration has reference, mainly, to the necessities of the civil government, and to certain purposes of general statistics of population.

It is a singular circumstance in the history of vital registration that in the most highly civilized and enlightened states, the medical vouchers or certificates concerning the causes of death have, hitherto, almost without exception, been both given and received so inexactly as to defeat one of the most important results which the medical profession and society ought to derive from publicly registered causes of death. Neither in Great Britain nor in France do the publicly registered individual causes of death satisfy the claims of medical and sanitary knowledge with regard to precision and completeness in their statement. In the endeavor of this Bureau of Vital Statistics to secure such accuracy and fullness in the statement of the cause of death in each individual decedent, nothing has been more remarkable or more difficult to overcome than the tendency observed in death-certificates

to dignify and vouch for the last *phenomena* of mortal disease as the actual cause of death, though such phenomena "are, in general, but the penultimate effects of the real 'cause' of death."

The Metropolitan Board of Health has become indebted to the enlightened good sense of the medical practitioners in New York and Brooklyn for such a reform and thorough improvement in regard to the scrupulous definiteness and fullness in certified causes of death, that these certificates now afford much aid in revealing the actual pathological and unhygienic conditions under which the greater number of deaths occurred.

RULES OBSERVED IN THE BUREAU OF VITAL STATISTICS CONCERNING DEFECTIVE CERTIFICATES OF DEATH.*

Certificates are returned to physicians for further statements and explanations when any one of the subjoined names is given as the only cause of death, unless the circumstances of the sickness, the accident, or causes as stated therein are also given in such terms as to justify granting a burial permit and the public registration. The true and accepted cause of death will be stated in the burial permit and on the death register.

ABORTION.—If not a certificate of a still-birth, return certificate and ask for *cause* of death and for the period of gestation.

ABSCESS.—Its location in or upon the body, and the time of its continuance.

AGUE.—Was it intermittent fever? Explain the cause.

ANOREXIA.—Its cause must be stated. If from stricture of oesophagus or other adequate disease the burial permitted.

APOPLEXY.—The time from attack till death must be stated, whatever the age and circumstances of the deceased. (a.) Must be certified by a physician of known responsibility or sent to coroners'. (b.) If given as the only cause of death in a child under ten years of age it is not to be received without satisfactory explanation from a responsible medical attendant.

ASPHYXIA.—Its exact cause must be stated.

ATONY.—From what cause? Duration of the disease.

ATROPHY.—Of what part of body and what cause?

BLOODY FLUX.—From what part? Time of its continuance.

BOIL.—What part of body? Was it an anthrax?

BREAST DISEASE.—Was it cancer? or give full explanation.

CANCER.—Of what part of body? How long in progress?

CARIES.—Of what bones? What cause?

CATABARR.—Of what organ? or state what disease?

CHEST DISEASE.—Reject and ask for name of the disease.

CHILL OR COLD.—Reject and ask for disease.

COLIC.—Was it lead colic? What cause? Time.

COLLAPSE.—Return certificate and ask what disease and cause.

COMA.—Reject the certificate and ask what disease?

CONGESTION.—Return the certificate and ask what disease.

CONGESTION OF BOWELS.—Return the certificate and ask what disease.

CONGESTION OF BRAIN.—The time must be stated, and unless certified by a well known and reputable physician, obtain further information before granting a permit.

* This schedule of Rules has enabled the Board of Health to give to its Vital Statistics a kind of accuracy and value that would have been almost unattainable without such regulations.

CONGESTION OF LUNGS.—The time must be stated, and, if possible, the cause of congestion.

CONGESTION OF MUCOUS MEMBRANE.—Return the certificate and ask what disease.

CONGESTION OF UTERUS OR VOMB.—Reject the certificate and ask what disease.

CONSUMPTION OF BOWELS.—Must be registered *Tuberculosis Mesenterica*, and if not a child, and cause not stated, return the certificate and ask for cause of disease or death.

CONVULSIONS.—The time of continuance to be stated in all cases of infants, and, if over two years of age, the disease or cause that produced convulsions must be stated. In case of infants, the cause to be stated if possible.

DEBILITY (OR DEBILITAS).—If not an infant, or old person, return certificate and ask for cause.

DECAY AND DECLINE.—If not in old age, ask disease.

DROPSY.—Ask and certify of what part, or from what disease.

DYSPEPSIA.—Reject and ask for disease or cause.

DYSPEPSIA.—Reject and ask if there is not a better cause—return the certificate.

DISCRASIA.—Return certificate and ask what disease or what cause.

DIABETES.—Return certificate and ask what disease or what cause.

EFFUSION.—If not into some cavity or vital organ, return the certificate and ask what disease or cause.

EMPHYSEMA.—Ask if of the lungs? If traumatic,—time.

EMPYEMA.—Ask in what cavity and from what cause. Time?

ENCEPHALOID.—Return the certificate and ask what part of body? Time in progress.

ERUPTION AND ERUPTIVE FEVER.—Return and ask name of disease and time in progress.

ERYSIPELAS.—Return certificate and ask time and part of body affected.

FALL, OR INJURIES BY FALLS.—Return unless fully explained, and proved not from culpable causes.

FEVER.—Return and ask—What fever? How long in progress.

FRACTURE.—What bones? When? How? What caused death?

FRIGHT.—From what cause. Time of occurrence.

FUNGUS.—Return certificate and ask what disease.

GLANDS, DISEASE OF, ETC.—What glands and what disease.

HEMORRHAGE.—From what part? What cause? Time.

HEART, DISEASE OF, ETC.—Ask time in progress unless the particular kind of heart disease is well stated, and if suspicious, return certificate and ask what kind of heart disease?

HECTIC, HECTIC FEVER, ETC.—What disease? or what cause?

HERNIA.—What kind? Time? Strangulated?

HIP DISEASE.—Time? What other disease. Certificate not to be rejected.

ILEUS AND ILLIAC PASSION.—How long continued? Cause—ask as to particular parts diseased.

INDURATION.—Ask disease.

INFLAMMATION.—Return certificate and ask of what organs and time. Cause.

INANITION.—Ascertain the cause if of over one year of age.

INFILTRATION.—Return and ask disease.

INJURY.—Return and obtain particulars, or call coroner.

MISCARRIAGE.—Return certificate and ask the cause, and also cause of death.

NECROSIS.—What bones? What disease? Time.

OBSTRUCTION.—Return certificate and ask what obstruction, and what disease and time.

PALSY OR PARALYSIS.—Return certificate and ask—Is it hemiplegia, paraplegia, general or locomotory ataxia? Time. Cause.

PARALYSIS OF LIMBS.—Under certificate is properly covered, and none other than small-pox, scarlet fever, diphtheria, and any other disease.

ERYTHEMA.—Diphtheria, scarlet fever, and any other disease. The term is not to be used except in the few exceptions.

ERYTHEMA DISSEMINATUM.—This can be used only in the few exceptions.

ERYTHEMA MULTIFORME.—Diphtheria, scarlet fever, and any other disease.

ERYTHEMA NODOSUM.—Diphtheria, scarlet fever, and any other disease. The term is not to be used except in the few exceptions. The term is not to be used except in the few exceptions. The term is not to be used except in the few exceptions.

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NOTES INSTRUCTIONS GIVEN WITH THE BURIAL PERMIT AT BOARD OF HEALTH CONCERNING THE DEATH FROM PREVENTABLE CAUSES.

Give the Undertaker the card for care of the Dead, and that these precautions are advised by the Board of Health.

Give a copy of the Disinfection Instructions, and request that it be handed to the family.

In Small-Pox, Scarlatina, Typhus and Cholera, order the soiled clothing to be disinfected by boiling for two hours. Bedding, carpets and infected lounges, to be kept away from the inhabitants of the house and neighborhood until thoroughly purified, as directed by the Board and the Sanitary Inspector who may visit the family.

Ask the following questions: Is family in want? Food or coal? Condition of premises. About how many inhabitants in house? Are there any other persons sick in the family? Record these facts. *Cholera must be carefully reported to the Sanitary Superintendent.*

SMALL-POX
SCARLATINA
TYPHUS FEVER
TYPHUS FEVER
CHOLERA
CHOLERA MALARIA
DYSENTERY
ENTERIC FEVER
CHOLERA FEVER
ENTERIC FEVER

**RULES FOR REJECTED CERTIFICATES AND THE CASES REFERRED TO
THE CORONERS.**

The Burial Permit clerks will keep a memorandum of name of deceased person, of the physician who certifies, and the undertaker or person who makes the application in case a certificate is rejected and returned for correction. And in every such instance (except in certain rare cases mentioned in Special Rules) the physician must have been consulted in writing. -

Keep the original certificate and all needful memoranda of every case referred to the coroners. Keep memorandum of reported violations of Health Laws relating to diseases or deaths.

**RULES TO BE OBSERVED REGARDING THE REFERENCE OF CASES
TO CORONERS.**

I.

The laws of the State require that an inquest shall be held by coroners "wherever a person has been slain, or has suddenly died."—[Revised Statutes, Chapter 2, Title 8, Article 1.]

Note of Explanation upon this Rule.—The words "*suddenly died*," in this law, are judicially and medically held to mean only such cases of death as have occurred in persons who within twenty-four hours were in such usual health and safety as not to be regarded as being liable, from any disease then existing and known, to suffer such sudden death. Any person dying alone and unattended, though *possibly* and *probably* from "Heart Disease," or from "Apoplexy," must, with rare exceptions, also be regarded as having "*suddenly died*"—in the meaning of the law. The causes and all possible circumstances cannot be, and are not specified in law, or by physicians, but we must judge by *circumstances*, and chiefly by this one, viz., that in regard to the cause no *good and reputable physician* offers a full and satisfactory certificate of causes of death, unless known to and attended by him at least twenty-four hours previous to the fatal event. Consumption and diseases of the heart, aneurism, apoplexy, and some other diseases that terminate life suddenly and unexpectedly, must be certified to have existed some definite time; but as regards apoplexy it may pass for interment on a good and full certificate of the *attending physician*, according to the rules, whatever the time, if no violence or blame can be charged or suspected, and if the said physician witnessed the symptoms and the death.

II.

The law passed by the Legislature, in 1847, states that the coroners shall hold inquest upon every person who has "*died under such circumstances as to require an inquest.*" That is, there must be an inquest held in every case in which there is reasonably suspected to have been some violence, abuse, cruel neglect, or *any intention to cause the death or injury of the person*, as well as in a case of sudden death by *unknown causes*.

Note of Explanation Upon this Rule.—Citizens, and especially officers of the Board of Health, or of the police of the District, are charged with the duty to report such cases to the coroners. Homicides and suicides, and every kind of *suspected cruelty* or intentional neglect, and every kind of casualty that *violently* causes death or *fatal injuries*, must be reported to the coroners. There may be two classes of exceptions to this rule, as regards cases under the last clause, and these are, firstly, certain cases of *fatal injury* and long delayed death, in which there was no *possible culpability*, as when some self-inflicted, but wholly accidental wound terminated fatally; or, secondly, in cases like this, in which some fatal disease supervenes, whether it was caused or aggravated by the casualty. But in these exceptional cases there must be absolute absence of blameworthiness, and a perfectly clear statement of the true cause or causes of death; and careful inquiry is required in all these cases.

III.

The Bureau officers and clerks will continue to observe that whenever a case is referred to the coroners, there shall always have been *previously to such reference*, a reasonable and earnest effort to obtain from the certifying physician—if there was one—as full and explicit a statement as he can make, upon all the questionable or suspicious points—such points to be distinctly stated in writing to the physician when his certificate is returned, or the messenger and request sent to him. And when it is equally or more desirable to have testimony from the family, or other persons, to establish or to remove the grounds of suspicion of probable or possible blame—such information shall be sought by direct inquiry—such inquiry always being in writing, and bearing the signature of the Bureau. But the clerks may observe the following exceptions to all points of this rule relating to seeking for testimony to show the grounds of suspicion of crime, or blameworthy acts.

(1). Send to the coroners at once and without wasting time on messages or requests, every case in which the evidence is clear that homicide, suicide, poisons, or other direct and unnatural causes of violent and sudden death have produced the fatal result. If any exception to this rule is made or advised on account of suspected insanity or *mal-intent* of the person who alleges that there was violence or other bodily harm done to the deceased, or on account of the well-known and excellent character of the family, the exception should be decided by the Registrar or some other *medical officer* of the Board of Health. For when a suspicion has been raised it must not be disregarded. Absolute medical and moral evidence alone can set it aside.

(2). When a dead infant is brought into the halls of the Board of Health, and any suspicion of *criminality* attends such a case, or if no certificate is brought with such a corpse, or if a corpse is credibly reported to be lying in any place in the city uncertified and *indecently neglected*, report the case at once to the coroners. Whenever, in such cases, the corpse is in the

halls of the Board of Health, it must immediately be placed under control of the Police, by requesting the Superintendent of Police to notice the facts and to take charge of the corpse and the person who chances to have possession of it, and also to order some proper and humane disposition of both until the coroner takes charge of them. Mere detention with a detective at the halls of the Board of Health, or in the house whence the corpse was brought, is our usage in regard to the dead infants in such cases. As respects a corpse *reported or found neglected and uncertified*, whether dead by violence or otherwise, the case should be at once reported in writing and separately to the Sanitary Superintendent and to the coroners. The Registrar should attend to these cases, and, in his *absence*, the chief clerk will decide according to his discretion, and will seek the aid of any competent medical officer in the halls of the Board of Health at the time.

SYNOPSIS OF THE RULES AND THE PRINCIPLE ON WHICH THEY ARE ARE FOUNDED.

Cases of homicide, suicide, persons found dead, deaths with attending suspicions of any kind of violence or from results of cruelty, neglect, or from intent to destroy life or permit it to be imperilled needlessly; also, such deaths as are not so properly and sufficiently certified by physicians as to prevent well-grounded suspicions, or possibility of crime or culpability, will be referred to the coroners, in accordance with the foregoing rules.

The principle to be observed is this, viz: *Permit no burial in case of deaths which certainly, probably, or with reasonable possibility, occurred from the violent and unnatural causes herein described, until the grounds of suspicion have been removed, or a coroner's verdict (or his official certificate) rendered. But first endeavor to obtain full information from the certifying physician upon any and all merely suspected or merely possible cases of wrong doing. The officer or clerk on duty should act with promptness and keep a perfect record of all acts and requests in regard to these cases.*

SUDDEN DEATHS FROM UNKNOWN OR UNCERTAIN CAUSES.

The statistics of violent deaths in the city of New York claim special attention alike from the sanitary and the magisterial authorities. They constitute no less than three and a half per cent of the entire mortality of the city. During the year 1868 they were 584 in number, or 3.56 per cent upon the total death list—695 being males and 189 being females. Six hundred and sixty-nine of these deaths (nearly five-sixths of the whole number), were accredited by coroners' juries to *accident and negligence*. No less than forty-six deaths are known to have been cases of homicide and ninety-eight were ascertained to be suicides. Considerations which profoundly affect the public welfare, both as regards social and political, as well as personal dangers to human life, manifestly require that the deaths caused by violence should be made the subject of special inves-

igation by the most competent experts in these departments of knowledge which are necessary for ascertaining in every case of violent or accidental death the true causes which were concerned in producing it. Indeed, the spirit of our civilization and the rights of humanity demand a thorough reform in the whole system of medico-legal inquiry into the causes of this class of deaths.*

It is not too much to hope that the day is near when no certificate of death will be considered as adequately vouched except upon an actual inspection of the corpse. Such a requirement might considerably add to the number of cases in which medico-legal inquiry would need to be ordered by the sanitary authorities: but in a short time, certainly in a single decade, it would be found that the more rigid the inquiry into the causes of death the fewer would be the deaths caused by culpable violence. Popular sentiment unquestionably sustains the sanitary authorities in the view they take of this subject.

* The subject of medical evidence for coroners' inquests will ere long have to be seriously considered in connection with the question subject of the better protection to life by the sanitary and civil authorities of the State. The proper examination of this subject would seem to belong jointly to boards of health and to the highest judicial advisers of the civil government. Plainly enough, there is something besides mere expert knowledge in law and in medicine required in order to secure the interests of life and health against the great wrongs to which society is now exposed as a result of ignorance and stupidity on the one hand and as a result of grossly culpable misuse of special knowledge and attainments, or at least of personal reputation and influence, on the other. Says one of the ablest of authorities upon questions of State medicine and medico-legal knowledge, Dr. Henry Wyldere Ramsey:

"The demoralization of experts under the present system can hardly be doubted. While we see many excellent and learned men devoting their great abilities to the public service in medico-legal inquiries, there are a few others who, as Lord Bacon says, 'may be accounted the left hands of covets, persons that are full of nimble and sinister tricks and shifts, whereby they pervert the plain and direct courses of courts, and bring justice into oblique lines and labyrinth.'"*—Ramsey's Address on State Medicine, before the Congress of the British Medical Association, August, 1871.*

Classification of Causes of Death, Certified by Coroners, in the Twelve Months ending December 31st, 1868.
CITY AND COUNTY OF NEW YORK.

WILLFUL VIOLENCE.										ACCIDENTS AND NEGLIGENCE.										DISEASES.																					
Suicides.					Homicides.					By accidents in the streets (exclusive of those by cars and other vehicles).	In and about buildings.	Casualties by and on wharves & shipbuilding.	By railroad cars.	By other vehicles.	Fractures of skull and other parts.	Injuries not specified.	Unclassified injuries.	Strangulation and suffocation.	Exposure and want.	Burns by explosives.	Burns by other causes.	Scalds.	Accidental.	Causes not ascertained.	Opium.	Other poisons.	Poison, hot Sulphuric acid.	Alcoholism and Intemperance.	Convulsions.	Apoplexy.	Congestion of lungs.	Asphyxia.	Disease of the heart and blood vessels.	Effects of heat and cold-droplet.	Other diseases.	Infants under a week old.	Still-borns.				
Laudnum.	Arsenic.	Opium.	Morphine.	Lacifer matches.	Poison, not stated.	Hanging.	By instruments.	Gun-shot.	Means used not stated.																													Various other methods.			
6	8	2	2	1	5	32	1108	3	11	35	15	56	26	57	20	115	8	42	36	11	12	40	40	161	10	10	10	10	63	134	98	1230	198	160	690	124	219				
Total suicides.....										98	Total deaths by opium and opiates.....										32	Total diseases, including 219 Still-Births, 1,522										Total by violence (physical and chemical), 813									
Total homicides.....										46	Total deaths by irritant & corrosive poisons										26	Total of all causes certified by Coroners, 2,345																			
Total accidents and negligence.....										609	Total deaths by drowning.....										177																				

BROOKLYN.

[illegible]

In the foregoing tabulations the fact appears that there were 1,532 inquests held upon persons that died from disease and various other causes than violence, (if the returns by the coroners are correct). There doubtless is an unknown number of dead in that list of non-violent deaths that might justly be accredited to those mild-mannered methods of homicide which coroners' juries fail to discover. Still, the ratio of violent deaths and deaths by casualties of all kinds, to the total number of sudden and unsatisfactorily certified deaths that are the subjects of inquests, is small. Our New York records for twelve months give this ratio as 100 to thirty-five. In London, Dr. Farr, of the Registrar General's office, has shown that the ratio of violent and accidental deaths, to those by other causes, upon which the English coroners hold inquests, is 100 to forty-six, in all England and Wales, and as 100 to seventy-seven in London. The ratio of violent deaths (including all kinds of casualties, poisoning, etc.) to the total population (of living) is 745 to the 1,000,000 (million) in England, 268 to the million in France, 486 in Prussia, 677 in Sweden, and 780 in New York,—estimating our city population at one million.

It is plain enough that if 884 persons in the million inhabitants in this metropolis (population now estimated at 1,000,000) are doomed to die by violence, in the year, there certainly is abundant reason why very careful inquisition and absolutely accurate returns upon the causes and circumstances of such violence should be rendered to the Board of Health. A remark will be made concerning this class of deaths, and the returns thereon, in a subsequent paragraph.

The greater part of the inquests that result in finding *death by disease*, are reputed to have been *sudden deaths*. A certain smaller number were referred to the coroners, because some presumed or known and culpable neglect or cruelty had been experienced by the deceased; and a still greater number were brought under inquisition because of some probability or suspicion of homicidal or suicidal acts. I had hoped to ascertain the facts regarding the alleged *reasons* that are given to and given by coroners for inquests, as provided for in the seventeenth section of the Sanitary Code, but I regret to find that the section has been allowed to be forgotten and neglected—a result that the Registrar could not prevent, inasmuch as the execution of that important point was vested in another department of the Board's service. There are reasons of great public and moral importance why that law should be faithfully observed.

The foregoing statements are preliminary to the consideration of the following points, which I need now submit to the Board:

First.—The office and functions of coroners are by law, and should ever be in fact, confined to the investigation of deaths that have occurred under circumstances that admit of the reasonable possibility or probability of homicide, suicide, or some other culpable cause. The Laws of the State of New York define the line of a coroner's duty thus: "Whenever any coroner shall receive notice that any person has been *slain*, or has *suddenly died*, or has been *dangerously wounded*, it shall be his duty." &c. [Revised

Statutes, Chap. 2, Title VII, Art. 1st.] And, in the year 1847, the following additional statement was made merely as a change and condensation of the phraseology: "Whenever a person is found dead under *such circumstances as to require an inquest*," &c. This phraseology plainly refers to the original statute, as before quoted.

As both the American laws and practice in regard to inquests have been derived from the English law and usages, I would quote the following passage from the English Registrar General's Report on this subject. He says: "Although no absolute rule has ever been laid down, it is generally understood that inquests are held not only where violence is suspected, but in diseases which, from the nature of their symptoms, are *liable to be confounded with death by violence*."

Thus, it plainly enough appears that whenever death occurs under such circumstances as to warrant a reasonable suspicion, possibility or probability, that the deceased person came to his (or her) death by any act of violence, neglect or act, for which any person or persons may reasonably be presumed to be responsible and culpable, then there should be held such an immediate and thorough investigation as the laws will authorize, for discovering (1) the cause of the death; and (2) the persons and the methods by which the fatal event was produced.

The practical difficulty that legislators and the writers on questions of medical jurisprudence have experienced in giving a definition to the field which coroners shall *exclusively* occupy, is apparent in the language of the statutes we have just quoted; and we find the terms employed by those most lucid of writers on jurisprudence, Drs. T. R. and J. B. Beck, are characterized by the same kind of indefiniteness and insufficiency as the statutes themselves. Yet this kind of insufficiency in the phraseology and description is, for the present, inevitable, and it has this advantage that it *offers no bar* to the ordering of an inquest, in any case that it can reasonably be presumed to have been caused by the violence or culpable acts of any person, or, even in any case in which the true causes and circumstances of the death are uncertified. The Drs. Beck have stated, in general terms, that if a person is found dead on the highway, on the banks of a river, or in a lonely place, or "if he be discovered to have paid the last debt of mortality, either in a sudden manner or at a distance from his home, the laws of civilized society demand an investigation of the cause, and, over this investigation, the officer called a coroner is appointed to preside." And, further, "the duty of the coroner extends to an examination of the circumstances connected with every case of sudden or suspicious death."

Practically, and in a strict sense, this language of the Professors Beck is stronger than the best English practice, and also stronger than the words of the statutes concerning inquests. But, the statement of the *principle*, in that language, is exceedingly clear and just. The able report of Dr.

* Beck's *Medical Jurisprudence*, Vol. II, Chapter 1.

Wm. Farr, upon inquests, and upon violent and sudden deaths, states that coroners' inquests are held on nearly all violent deaths, and in some sudden deaths, or deaths which appear to the coroner to require investigation.

In Great Britain, as in New York, the laws permit the coroners to decide *not* to hold an inquest in such cases as present no evidence of any violent or unnatural cause of death, though rumors or requests lead them to make inquiry. But in the words of the Report of the Registrar General, "the Legislature has provided for the *full investigation of* all the cases of death which require inquests to be held, or were liable in any way to be confounded with deaths by poisoning or violence."

Though the "first question to be kept in view in every inquest undoubtedly is," as Dr. Farr has stated,—"*Was the death the result of homicide?*" there is a series of general and special questions to be answered independently of that relating to the crime, or the mere circumstances of the death (which is a purely judicial question), in order to make such a record as society requires regarding the circumstances and causes of the death. The English Law (of 1838) is exceedingly explicit upon this subject. It provides that "in every case in which an inquest shall be held on any dead body, the jury shall inquire of the particulars herein required to be registered concerning the death, and the coroner shall inform the registrar of the finding of the jury," The chief of the particulars required to be registered is *the cause of the death*; and the 'Medical Witnesses' Act' of Parliament specifically provides that coroners *shall command the services of persons skilled in pathology and the analysis of poisons.*

The laws that prescribe the duties of coroners in New York do not make adequate provision for the skilled labor that frequently is required for clearing up and correctly setting forth the truth in a great variety of suspected or doubtful cases. Nevertheless, the coroner is authorized by the statute to "summon a physician or surgeon whenever he deems it necessary or desirable." [*Revised Statutes of New York, Chap. 2d, Title VII, Art. 1st, Section 8.*] It is much to be regretted that the Laws of New York do not provide for and actually require the employment of the collateral expert aids of chemistry, microscopy, and special pathologists, whenever in the judgment of the sanitary authorities the ends of public hygiene or of public safety and justice require such aids.

I have deemed it a duty which the Board of Health, the medical profession and the public had a right to expect, thus to examine and present the laws and usages relating to coroners' inquests. The first practical result of this inquiry induced us to set a double watch upon the various classes of imperfect medical certificates which certify to deaths that ought to be investigated by magisterial authority. The *second* result is witnessed in the rules and regulations adopted with reference to cases to be referred to coroners by the Bureau for the Board of Health. The *third* result was long ago witnessed, and still continues to be, in the refusal to permit interment without a reasonable medical certificate or a straightforward statement of

the cause or of the circumstances of death by the coroner. And the fourth result is now witnessed in the greatly improved returns and certificates by the coroners, including a vastly increased amount and value in the medical evidence and pathological facts adduced upon the inquests. Yet these returns and certificates of the coroners are often very imperfect and unsatisfactory; and the chief sources of this imperfection are found to consist in the absence of exact and scientific methods of inquisition into the true causes of death. Very important post-mortem examinations are not infrequently omitted altogether, or but very hurriedly performed, and the resources of chemistry and microscopy are almost wholly neglected. In the schedules appended, it will be seen that it becomes the duty of the Bureau of Vital Statistics daily to refer very important cases to the coroners. The various classes of deaths which we have marked in these two schedules, when the circumstances all favor the suspicion of *culpability*, are regarded as being so very liable to have occurred from intentional violence or neglect, that it is plainly *inexpedient*, if not contrary to the law, to neglect to procure an inquest, and, at least, to seek for the evidences that are needed regarding the actual cause of death. The number of cases which are so referred from the central office at the Board of Health, is about 700 in the year. The total number of deaths which are so unsatisfactorily and indefinitely reported to this Bureau as to render it desirable for the public welfare to have further information obtained before burial, amounts to twenty per cent of the total mortality in the city outside of hospitals. In about 2,000 of these unsatisfactorily certified deaths, we succeed in obtaining some additional information from physicians or acquaintances of the deceased, and, upon such information, we refer about five per cent, or 100 to the coroners. In a recent case of this kind, the coroner, at our request, examined the contents of a deceased person's stomach, and found one and a half ounces of *Paris green* or arsenate of copper! Yet the chief and most far-reaching benefit of all this carefulness is the wholesome restraint and care which the official inquiries and rigid observance of rules exact upon physicians and persons concerned in the burial of the dead.

There is great need of an additional element of inquiry and supervision in this and other classes of cases; and the kind of investigation which is necessary can be given only by a competent medical officer, acting under the sanitary authorities. If this kind of investigation were provided for by the Board of Health, our information upon these very important and now imperfectly understood cases would become accurate and complete, the public health and general welfare would be promoted.

As the case now stands, concerning the evidence or voucher that is accepted by the Board of Health in respect of individual deaths, not a day passes in which there are not several certificates of death presented that require and receive revision at the hands of the medical attendants of the decedents, and yet remain unsatisfactory. Most of this class of certificates are made by ignorant charlatans, or by grossly careless or utterly bad men, who fail to state the true cause or circumstances of death. For example,

e terms—congestion of the bowels, the brain, the liver, etc.—will be separately assigned as causes in cases that merely suffered, or appeared to suffer symptoms of such congestion in the last phenomena and last hour of life; or, in cases of criminal abortion, a bad class of men will certify ‘Ovarian Dropsy,’ ‘‘ Meteorrhagia,’ ‘‘ Peritonitis,’ ‘‘ Collapse,’ ‘‘ Typhoid Fever,’ etc.; but we need not particularize further concerning the faultiness and suspicious circumstances that characterize numerous certificates of the cause of death. It is sufficient that we assert that fully ten per cent of all the certificates require a kind of revision that can be made only by actual inspection of the dead body, or by obtaining further evidence. Of this class of certificates, after seeking for desired revisions, we have hitherto felt constrained to refer about one-half, or something more than 1,000 yearly to the coroners. It does not admit of reasonable doubt that the duty of employing at least one sanitary officer to perform expert service in viewing the remains of decedents (according to the old coronal law, *super visum corporis*), and in obtaining and reporting evidence regarding the causes of death, will ere long be regarded as an imperative sanitary duty in the city of New York. It may here be remarked that the English Registrar General and leading medical authorities of Great Britain are intelligently endeavoring to induce Parliament to provide by statute for a class of expert sanitary officers, who shall view the corpse and obtain evidence in every case of death, but a kind of evidence that is not usually embodied in a medical attendant’s certificate, and yet which would not wholly supersede the latter.

It is not designed by these remarks to inveigh against the existing system of coronal inquests in the State of New York. But we here plainly state the fact that the public welfare, and especially the interests of the public health, require the services of medical experts to make personal inspection and investigation in regard to the death of more than ten per cent of all who die in New York.*

STATISTICAL NOMENCLATURE OF THE CAUSES OF DEATH.

By referring to the preceding consolidated abstract of the causes of death as registered in this Bureau during the year 1868 it will be seen that for the purposes of public registration we have succeeded in bringing forward our published list with only 178 separate names for the causes of death; but the public registers of the Bureau of Vital Statistics bear the

* It is a singular fact that the system of mortuary investigation under the Austrian government should be far in advance of any other in the civilized world. We speak of the system, and not of the actual mismanagement which may attend it. Every death is required to be reported to the local magistrate, who sends the *Todtenbeschauser* (corpse-viewer), a medical expert, to inspect the corpse. The latter officer obtains evidence from the medical attendants and others. If the death has occurred from any violent or suspicious cause, or under the treatment of quacks, it is at once referred to a court of medical experts, the *Gerichtliche Leichenbeschau* (official corpse-inspection).

names of several hundred causes and conditions which had some complicating, predisposing or collateral relation to these deaths.

The fact is now conceded by the best medical authorities that it is eminently desirable to have the names of diseases and causes of death modified only by those great progressive discoveries in pathological knowledge which enable medical men to express in exact terms the true names of diseases and their complications.

Vital statisticians and public hygienists will ever acknowledge their great indebtedness to Dr. Wm. Farr, of the English Registrar General's Department, for the aid he has given to the very difficult task of preparing an acceptable basis for the registration of vital statistics throughout the civilized world. No better testimony to the convenience and utility of Dr. Farr's system, as recommended by the International Statistical Congress, could be quoted than that which appears in the mortality abstracts in the first three annual reports of the Metropolitan Board of Health. The necessities of the public hygienists and sanitary officers require that they should have the advantages of a compact and readily-handled system of mortality records. It is also eminently desirable that such current and published records should have a uniform basis of systematic arrangement and nomenclature, but it is idle to think of making the descriptive certificates or vouchers concerning the causes of death conform to the limitations and analysis by which the currently published records of vital statistics are classified and arranged for the practical uses of health authorities. *The latter duty must be performed under the direction of these authorities.*

We deem it expedient to submit these few remarks upon the statistical nomenclature which the Board of Health has consented to be adopted in the published report of its Bureau of Vital Statistics, and would add that in the rapid progress which is being made in the more exact knowledge of causes and pathological conditions which bring our fellow-beings to the grave, it is presumed that the names by which these causes are designated may increase in number as a consequence of their increasing definiteness. These exact and nicely defined terms in nosology are found to be aids instead of hindrances to the hygienist. They must continue to be carefully entered upon the public registers of mortality, together with the leading and more generic names of the causes of death. They serve as trustworthy guides to a correct discrimination of the preventable, the accidental, the culpable and the inevitable circumstances connected with each individual death.

In a former report to the Board the Registrar had occasion to notice the great effort which was being made by the Royal College of Physicians of London and the sanitary authorities of Great Britain to secure the adoption of the most exact and useful nomenclature of diseases and causes of death. That undertaking has resulted in the recommendation of a nomenclature based upon the most exact kinds of medical and surgical knowledge; and very wisely they have recommended that the nearly 1,200 names which they have entered in their classified nosological catalogues shall be regarded simply as a "*provisional nomenclature and definition of diseases.*"

The first of these is the fact that the British Government has been unable to obtain the necessary information from the United States Government regarding the movements of the British ships.

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The death-rates in the total adult period of life, and in childhood after the age of ten years, have begun to decrease. Statistical evidence upon this subject has been presented in this and the last previous annual report. But it is not yet our privilege to show that there is any falling off in the pressure of causes that destroy early childhood. The fearful rates of infant mortality can only be reached by comprehensive and earnest work that may require years of endeavor.

Yet there is already a positive improvement in the general health of New York and Brooklyn, and this gain to the sum of the vital enjoyment and health which adds to human lives an increased value, both to the world and to the individual, bears a steady ratio to the decrease of death-rates in the masses. The comprehensive application of sanitary knowledge must, however, in some future time, fully double the present value of the general mass of human life in the Metropolitan District, and if this great result is not reached in the present it should be in the next generation. This will be attained when the average death-rate falls to 17 in 1,000 annually, for that degree of sanitary improvement would be attended by such security against premature and disabling disease as would add immensely to the practical usefulness of the individual lives among all classes.

ELISHA HARRIS,

Registrar and Corresponding Sec'y, M. B. H.

REPORT

OF THE

DEPUTY REGISTRAR, BROOKLYN.

BUREAU OF VITAL STATISTICS,
METROPOLITAN BOARD OF HEALTH, }
BROOKLYN, Dec. 31st, 1868.

To ELISHA HARRIS, M. D., *Registrar of Vital Statistics:*

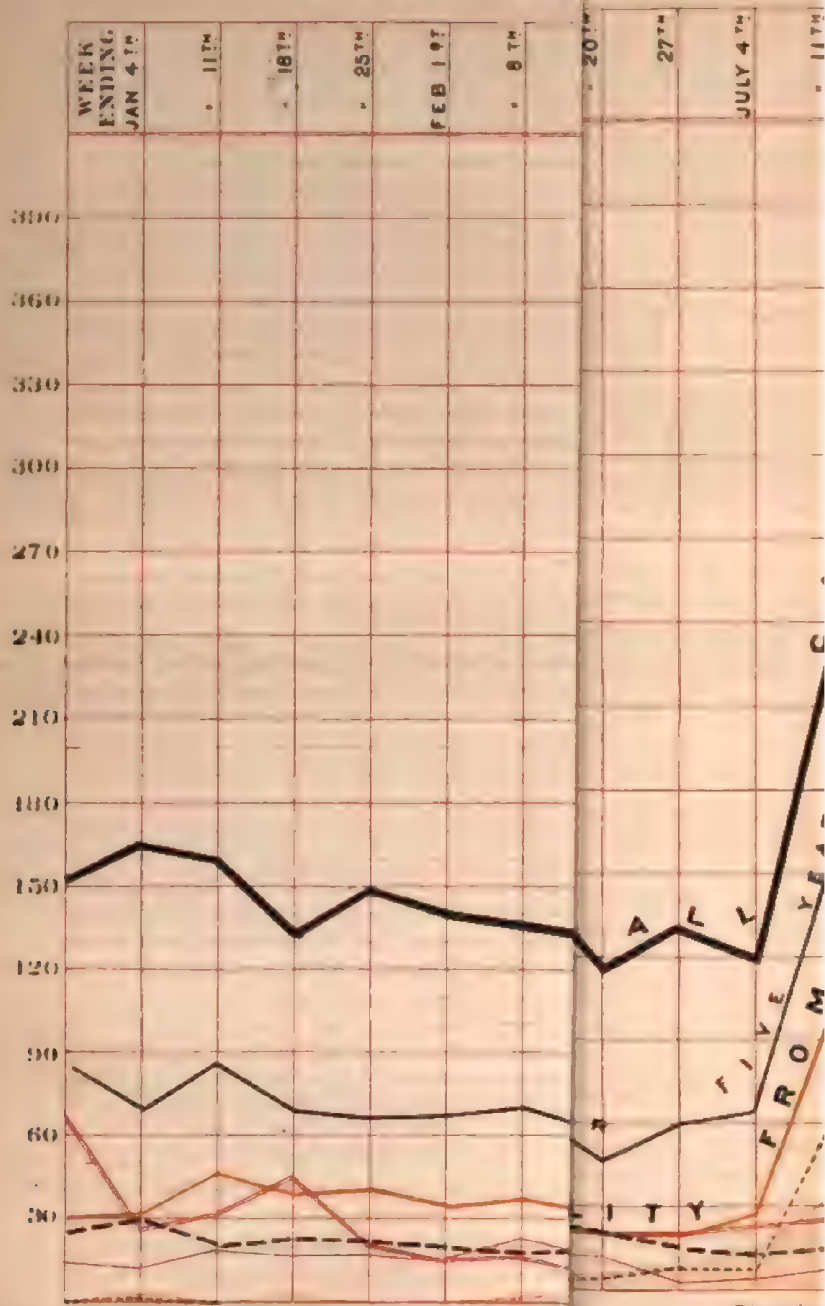
Sir—Again it becomes my duty to forward the tabulated results of a year's registration of the vital statistics of Brooklyn, and to give a summary of the work of the Bureau for the period. This you have had in weekly instalments, but, as the study of the narrower field has been my special duty, its teachings demand a brief recapitulation.

In the absence of pestilence the evidence of the influence of the Board of Health in lowering the rate of mortality in our city has become the principal feature of interest in its sanitary history for the past year. That time should have been required to make this influence decidedly manifest on our weekly bills of mortality is evident, when the magnitude of the work is taken into consideration, and it is only within a short period that the evidence calls for some explanation of a saving of life, which cannot be accounted for without such an admission as the foregoing. The nature and amount of the work accomplished has been detailed in the reports of the Assistant Sanitary Superintendent, but its full scope cannot be represented in numbers and tabulations. Sanitary Inspectors, each in his district, have reported all the manifest sources of danger to the public health, and have called upon the city authorities and owners of property, in the name of the Board, for their abatement; they have visited all tenement houses and cellar habitations (which, fortunately for our city, are comparatively few), and have enforced in them the requirements of the code; they have awakened and compelled an interest in practical hygiene among the masses of our population, and, by giving prompt attention to complaints of citizens of violation of ordinances, have caused the public to look to the Board for advice and relief, and have made the body of citizens co-workers with it in sanitary reform. This work has been accomplished by a small corps of Inspectors, supported by the authority and influence of the commission, and from their labors, prosecuted faithfully and continuously, it results, at length, that a population of nearly 400,000 presents not only a lower death-rate, but has suffered, for the past three months, a less mortality than three-





THE COURSE SEASONS



PREPARED UNDER THE DIRECTION OF THE REGISTRAR
Dr. F. J. Sigwalt, del

The time

HYDER FLANK - 5:11

THE COURSE OF SEASONS



PREPARED UNDER THE DIRECTION OF THE REGISTRAR
By F. J. Fawcett (et al)

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fourths of that number when the Board assumed sanitary control over the city.

The distinctive meteorological features of the past year were an excess of both heat and moisture during the summer. Water formed permanent pools in localities where temporary accumulations only had been before witnessed. For a short period the heat was unusually fierce, and in many instances of fatal intensity, as shown by the number of sun-strokes, which was greater than in any previous year of which the record has been preserved. As a natural result of the excess of heat and moisture, malaria prowled about our suburbs, and morbid influences, beyond sanitary control, were set at work in the heart of the city, resulting in an unprecedented infant mortality. During the heated term physicians daily reported to the Bureau the exceptionally fatal tendency of all diseases of infants, and mainly of diarrhoeal affections, and the failure of therapeutic measures of well recognized efficacy, as if they were counteracted by some subtle poison; every successive visit finding the patient in deeper depression and more imminent danger. The mortality of this season, therefore, should not be regarded as furnishing proof of neglect of sanitary precautions, or as invalidating the evidence of improvement in the sanitary condition of the city, for it was mainly due to climatic influences, and when the season of Cholera Infantum had passed, the city enjoyed a period of unparalleled healthfulness, the average death-rate for the past eight weeks being but eighteen per one thousand, and the weekly rate falling as low as fifteen per one thousand, eleven per one thousand being the most healthy average in the healthiest localities.

POPULATION.—The weekly death-rate has hitherto been computed from the census returns of 1865, which represented the population of Brooklyn as 292,112; now no competent authority rates it at less than 350,000, while the weight of sound computation carries it far towards 400,000. The census of 1865 is known to have been deficient in the elements of reliability, and since that date whole quarters of the city have sprung into existence. During the past five years 6,708 houses, mainly of three stories, have been erected within the city limits, 2,629 of which were built during the year ending June 30th, 1868. This increase of capacity, following the natural growth of the city's population, and the unusual tide of immigration from every quarter of the world, which attended the close of the war, indicates a rapid aggregation of numbers. A means of estimating the actual population of the city, may be sought in the registration record of voters previous to the last election for President, for the excitement of the campaign was such as to call out every one entitled to the franchise. This record must be supposed to furnish a reliable basis of calculation. Should the time come in the history of our great cities, when its truthfulness can justly be called in question through successful endeavors to defeat the popular will, it would soon become necessary to treat them as morbid growths upon a fair political system—"ne republica aliquid detrimenti capiat." If the number of registered voters in the wards where the majority of population is native, be multi-

plied by five, and in which the foreign element preponderates, by six, the total population of each ward may be approximately ascertained. The population of the entire city, on this computation, is nearly 369,000. The accompanying table gives the number of buildings erected in each ward since June, 1864, the number of voters registered in each previous to the last election, the population by the census of 1865, the present population of each computed in the manner above mentioned, the total mortality of each for the last two years, calculated to the 30th of September of each year, and the death-rate of the latter per 1,000 of estimated population:

NUMBER OF WARD.	Number of houses built in the last four years.	Number of voters registered Octo- ber, 1868.	Population by census of 1865.	Estimated pre- sent population.	Mortality for year for year ending Sept. 30, 1868.	Mortality for year for year ending Sept. 30, 1867.	Death rate, per 1,000, for 1868.
1.....	30	1,509	6,128	7,545	157	129	20.80
2.....	15	2,103	8,760	10,515	247	273	23.49
3.....	50	2,100	8,890	10,500	158	150	15.07
4.....	13	2,608	11,506	13,040	273	233	20.95
5.....	83	3,861	17,820	19,305	526	581	27.25
6.....	122	5,199	26,407	31,194	815	769	26.12
7.....	568	3,751	15,968	18,755	364	382	19.40
8.....	852	3,517	9,428	17,585	318	334	18.08
9.....	1,511	5,932	23,443	29,660	701	775	26.66
10.....	624	5,995	28,666	35,076	772	714	21.45
11.....	191	4,092	18,242	20,460	493	570	24.99
12.....	100	3,630	13,085	21,720	519	457	23.89
13.....	115	3,751	17,791	18,755	512	387	21.98
14.....	97	3,613	15,425	21,678	554	500	23.55
15.....	320	2,925	11,449	14,625	337	298	23.04
16.....	355	4,208	24,379	25,236	1,000	768	30.62
17.....	452	2,867	10,234	14,355	267	296	18.62
18.....	320	1,483	6,053	7,415	258	168	23.71
19.....	215	2,270	8,055	11,350	278	224	24.46
20.....	461	3,844	13,980	19,220	361	221	18.78
Total.....	6,708	69,247	296,112	368,869	8,992	8,235	24.37

MORTALITY.—The wards in which the death-rate was above the average, were the Sixteenth, Eighteenth, Fifth, Ninth, Sixth and Fourteenth. The characteristics of the several wards, as affecting their death-rate, have been noted in previous reports, in which a nearly similar result was recorded. The Sixth ward owes its slight excess over the average, to its hospitals, both of which have been recently enlarged.

Heretofore the year of the Bureau has closed with the third quarter of the calendar year, so that for purposes of comparison with previous reports, it will be necessary to take a corresponding period of 1867 and 1868, the appended tables of mortality being computed for the calendar year.

The total number of deaths for the twelve months ending September 30th, 1868, was 8,982, and for the previous twelve months, 8,236, a difference of 756. The deaths for the six months ending September 30th, 1866, were 5,087; for the corresponding period of 1867, 4,512; and of 1868,

5,122. It appears, therefore, that the mortality of the past summer was greater than during a season of epidemic cholera, that of the 756 deaths of the past year in excess over its predecessor, 610 occurred during the summer half-year, while the mortality of the winter was nearly the same for the two successive seasons, with a decided increase of population in the latter. The following table gives the mortality by wards, for the summer half-year, for three years.

WARD.	1866.	1867.	1868.	WARD.	1866.	1867.	1868.
1.....	83	79	88	11.....	359	297	221
2.....	172	138	139	12.....	582	285	319
3.....	91	63	88	13.....	180	213	230
4.....	169	139	168	14.....	279	265	314
5.....	328	312	302	15.....	141	170	171
6.....	434	396	457	16.....	470	481	617
7.....	179	196	214	17.....	148	134	164
8.....	251	178	197	18.....	86	98	133
9.....	378	464	459	19.....	114	110	181
10.....	433	562	449	20.....	175	132	183

While nearly all the wards, all but the Third and the Eleventh, show an increased death-rate over previous years, during the summer, the unusual mortality from cholera infantum, and from the effects of excessive heat, indicate the share which the extraordinary meteorological influences of the season had in the result. The improvement which has marked the fourth quarter of 1868, under climatic influences not unusually favorable, more than compensates, as an indication of the sanitary condition of the city, for the gloomy record of the summer.

While the comparison of mortality by wards is of interest, because their boundaries embrace well recognized divisions of population and of local administration of government, it does not present the highest advantages for sanitary study. Every ward includes salubrious and insalubrious districts, the total mortality of the ward giving no indication of the healthfulness of favored localities or of the sanitary wants of its sickly settlements. Thus the Sixth ward is divided by Hicks street into two equal but entirely different sections, the eastern section being unsurpassed in healthfulness, while the western section is scourged by every breath of epidemic disease.

CONSUMPTION.

With the view of commencing an investigation into the influence of topography upon disease, and of confirming and illustrating in our city the truth of the relations existing between damp houses and pulmonary consumption, as shown by Dr. Bowditch in Massachusetts, and by Dr. Buchanan in Great Britain, certain wards were chosen and maps were made in such a manner that every death from Phthisis for a number of years might be marked on the chart opposite the locality of its occurrence.

The wards chosen were the Fifth (in which last year's record indicated the largest proportion of deaths from consumption), the Second, the Sixth and the Tenth. In all of these wards the evidence points to an excess of consumption at the lowest levels; and in two of them, to a crowding of fatal cases of this disease in localities where the cellars are unusually damp, and in rainy seasons flooded, although their dwellings differ in no other respect from the average of the ward.

Along Tillary street, in the Fifth ward, where the land lies lowest, much of it having been made by the filling of salt-marsh, and old houses, with overflowing cellars, stand at levels below the present street, there is a larger proportion of phthisis than in any other quarter of the ward, although the northwest corner, between the Navy Yard and the river, is a fertile soil for all manner of disease and abounds in consumption.

In the Tenth ward the fatal cases of consumption are grouped about a point at the corner of Hoyt and Baltic streets, near the canal, in a region where overflowing cellars abound.

In the Sixth ward but few deaths from consumption are found east of Hicks street, the disease following the old coast-line of the beginning of the present century, as marked on the chart.

The Second ward presents no points of interest in the grouping of deaths from phthisis.

Numerous instances have been reported to the Bureau of families which took possession of cellar habitations several years ago, enjoying at the time excellent health, in which the adults are suffering from phthisis and the children from hip-joint disease and caries of the spine.

The following tabulations of *adult* mortality from consumption have been made from the materials collected for the study of the topography of the disease in the wards mentioned. They prove that consumption has not increased in proportion to the increase of population, and indicate an improvement in its sanitary condition. The charts are reserved for further progress in the study, and for an annual report in which fewer topics of interest press for consideration. This study has induced us to commence the compilation of registers of each ward, in which, by finding the street and the number of the house, the total mortality of every dwelling for a period of five years may be readily found. Such registers would be invaluable to sanitary inspectors in their search for sources of danger to the public health:

Adult Mortality from Consumption in the Second, Sixth, Tenth and Fifth Wards for a series of years.

YEAR.	No. of Deaths.	SEX.		United States.	Ireland.	England.	Scotland.	Germany.	British Amer- ica.	Other Nation- alities.
		Males.	Females.							
SECOND WARD.										
1863.....	34	14	20	9	21	3	1	.....	.....	.....
1864.....	33	17	16	9	19	2	2	.....	.....	1
1865.....	31	17	14	11	20	.....	.....	.....	.....	.....
1866.....	32	17	15	9	17	2	1	2	1	.....
1867.....	25	8	17	8	16	.....	.....	.....	.....	.....
Total.....	155	73	82	46	93	7	4	2	2	1
SIXTH WARD.										
1863.....	56	28	35	23	33	4	.....	4	.....	2
1864.....	70	23	47	24	33	9	1	1	2	.....
1865.....	67	32	35	32	30	1	1	2	.....	.....
1866.....	68	29	39	23	35	1	1	3	.....	3
1867.....	68	31	37	19	38	2	.....	7	1	3
Total.....	339	143	196	121	169	19	.....	17	3	8
TENTH WARD.										
1863.....	57	29	28	24	28	2	.....	.....	.....	1
1864.....	78	45	32	31	31	1	3	8	2	2
1865.....	88	43	45	40	37	2	1	6	1	1
1866.....	92	45	46	44	30	5	4	6	1	2
1867.....	92	42	50	39	39	3	2	6	1	2
Total.....	407	208	201	178	165	13	10	28	5	8
FIFTH WARD.										
1858.....	54	34	20	20	32	1	1	.....	.....	.....
1859.....	64	25	39	19	39	2	.....	1	1	2
1860.....	53	27	31	18	35	3	.....	1	1	.....
1861.....	71	43	28	23	41	2	.....	4	1	.....
1862.....	62	35	27	22	25	3	.....	.....	.....	.....
1863.....	63	39	29	19	44	2	2	1	.....	.....
1867.....	57	33	24	21	30	2	2	2	2	.....
Total.....	434	236	198	142	256	15	5	9	5	2
Sum of Totals..	1,326	658	677	487	683	53	22	56	15	19

SUMMARY OF MORTALITY FOR 1868.

The total number of deaths for the calendar year 1868 was 8,750, a rate of thirty per 1,000, according to the last census, and of twenty-three per one thousand, according to our estimate of population. Of the several classes of the Statistical Nosology in use in the Bureau, the numbers were as follows:

Zymotic diseases.....	3,050
Constitutional diseases	2,023
Local diseases.....	2,644
Developmental diseases	759
Deaths by violence.....	274
Total	<u>8,750</u>

Of the zymotic class, the largest number of deaths was from Cholera Infantum, 1,151. Scarlatina was also in excess over previous years, having caused 487 deaths. Measles and Typhoid Fever were, however, less fatal than usual, thirty lives having been lost by the former and 103 by the latter.

Of the constitutional class, Consumption was the cause of 1,098 deaths. Under the head of *Tabes Mesenterica*, or *Marasmus* 415 deaths are recorded. These are not all deaths from tuberculization of the mesenteric glands, for whenever an infant, or even an adult, emaciates and dies without symptoms pointing to some other definite form of disease, a certificate is given of death from *Marasmus*, and the case is recorded under *Tabes Mesenterica*.

Of local diseases, Pneumonia caused 448 deaths and Bronchitis 182. Bright's Disease of the Kidneys is given as the cause of 103 deaths, which is undoubtedly below the real number due to this insidious affection. As it can often be recognized only by the employment of chemical tests, it passes very frequently unsuspected, the fatal result being attributed to an intercurrent inflammation, which is merely a sequel and consequence of the affection of the kidneys. This inference is based upon an extensive hospital experience, and upon a large number of post-mortem observations showing the great frequency of this disease, particularly among the foreign population of our city.

In the developmental class the number of deaths in child-birth and from Puerperal Fever was but thirty-one. As the number of births in the city was nearly 16,000, and the number of deaths in child-birth and from the dangers incident upon it forty-five, the rate per thousand was but 2.8.

Of violent deaths seventy-two were from drowning, and fifty from burns and scalds. Measures have been adopted by the Board of Health to diminish the number of accidents from the former cause, while the inspection of all fluids sold for purposes of illumination will guard against the latter.

The cases of suicide were twenty-seven in number; the same for 1867.

The "Consolidated Abstract of the Causes of Death" has been made out with great care from the certificates of death, and is as trustworthy as our sources of information are reliable.

The evidences of improvement in the sanitary condition of the city, of which we have spoken, is furnished by comparison of the weekly mortality of the last quarter of the year for the past three years.

1866.

Week ending October 6	177
Week ending October 13	148
Week ending October 20	142
Week ending October 27	139
Week ending November 3	141
Week ending November 10	157

559

Week ending November 17	143
Week ending November 24	130
Week ending December 1	134
Week ending December 8	120
Week ending December 15	127
Week ending December 22	120
Week ending December 29	175
Total	<u>1,862</u>

1867.

Week ending October 5	181
Week ending October 12	174
Week ending October 19	143
Week ending October 26	140
Week ending November 2	138
Week ending November 9	161
Week ending November 16	159
Week ending November 23	163
Week ending November 30	131
Week ending December 7	154
Week ending December 14	144
Week ending December 21	175
Week ending December 28	152
Total	<u>2,015</u>

1868.

Week ending October 3	196
Week ending October 10	184
Week ending October 17	164
Week ending October 24	137
Week ending October 31	150
Week ending November 7	135
Week ending November 14	141
Week ending November 21	131
Week ending November 28	135
Week ending December 5	108
Week ending December 12	126
Week ending December 19	140
Week ending December 26	152
Total	<u>1,899</u>

The accompanying table contains the number of deaths returned as having occurred without the limits of the city, but within the boundaries of the Metropolitan District, during the past year. These numbers do not embrace the entire mortality of this region, for interments in the rural cemeteries still take place without permits from the Board of Health. An agent of the Board in each town of the District would secure accurate returns.

1868. Months.	Zymotic Diseases.	Other Diseases.	Total.
January	28	42	70
February	12	46	58
March	14	53	67
April.....	13	51	64
May	8	40	48
June	6	37	43
July	64	59	123
August	68	85	153
September	25	68	93
October.....	21	76	97
November.....	11	36	47
December	12	62	74
Total.....	282	655	937

BIRTHS.

There were 131 births returned to the Bureau after the report for the last quarter of 1867 had been forwarded, making the entire number returned for the period, 1,348. The number returned up to September 30th, 1868, was 3,716, making the entire number for the twelve months, 5,064, a very slight improvement on last year's registration, and but a fraction of the real aggregate.

MARRIAGES.

To the marriages reported for the last quarter of 1867, there remain eighty-nine to be added, making the total for the quarter 470. For the first quarter of 1867, 263 marriages were returned; for the second, 416; for the third, 353; and for the year, 1,502. The number returned for the first quarter of 1868, was 668; for the second, 1,106; and for the third, 555. This approximation to the probable number solemnized within the district, is a source of encouragement for the future, and reflects credit upon the clerical profession, for, while it is often an unpleasant duty to secure the information which the marriage returns require, it has not taken advantage of the impunity that has hitherto followed neglect of the requirements of the code, but has conscientiously given time and pains to the furtherance of the important ends of marriage registration. The Bureau is now often consulted for the information which it has stored up for a time of need. Much of this improvement is due to the well directed efforts of Dr. Henry R. Stiles, who signalized his connection with the Bureau by personal appeals to the majority of the clergy of the city in behalf of this important department of its service.

PUBLIC HYGIENE.

Our city occupying a healthy site, enjoying a climate temperate and invigorating which the most dangerous epidemics visit rarely and with abated violence—its people willing and eager to secure every sanitary improvement which the highest civilization demands—lavish in expenditure

for public works—its intelligence welcoming cordially a Board of Health capable of watching over its sanitary interests, ought to be, in spite of the stream of poverty and ignorance which is constantly flowing in upon it, one of the safest places of residence in the land—much safer than those hybrids of town and country where sanitary works and sanitary government are altogether neglected. It is the duty of sanitary authorities to point out clearly to the people in what manner this result may be secured, to awaken general interest, and diffuse general information respecting hygienic laws. In an ignorant and brutalized population compulsion alone is of avail; willing obedience to sanitary regulations, and attention to important subjects beyond the scope of sanitary legislation, can be secured only in a community thus enlightened.

There are three concentric regions in which hygiene assaults and controls sources of impurity and disease:

- 1st. Around the dwelling.
- 2d. Within the dwelling.
- 3d. Within the body, through food, exercise, clothing, &c.

1. The country is constantly pouring into the city the organic matter (food, fuel, &c.) necessary to sustain the city's life. From the prairies of the West, from the fields and gardens of the South, from foreign lands, from the seas, loaded trains and freighted ships, are constantly arriving and discharging the provision for the organic wants of our hundreds of thousands. This provision is not all consumed, but must leave an effete putrefiable and dangerous residue which, if not speedily cast out beyond our boundaries, is sure to breed and nourish the germs of dangerous disease. In the country, vegetable growth makes use of effete animal and vegetable matter, re-organizing it into living nutritious substances. In the city, this source of purification is wanting; small accumulations result finally in immense quantities of decomposing matter, which impregnates the soil, poisons the water, vitiates the air, and clings in putrid films to the walls of dwellings, and to all exposed surfaces. Unless, therefore, every portion of the city is provided with outlets for its excreta, and means of removal of its refuse, the accumulation works a steady and sure vitiation of all the avenues of life. The perfection of the drain and sewer-system, and of the machinery for the removal of filth from all its hiding places in alleys and streets, areas and corners is, therefore, an indispensable provision of safety. The people ought not to tolerate for any but the shortest lease of power, local authorities, who fail to keep the city thoroughly clean. All works or industries by which the air is polluted with organic matter, should be driven, as pests, beyond the city limits. Until public intelligence has been sufficiently educated to render such action unnecessary, constant inspection will be required to prevent the recurrence of nuisances, which wise foresight has succeeded in abating; but the day must come when society will frown upon, and treat as culprits, those who, either through neglect of duty or for the sake of gain, thus endanger the lives of their fellow citizens.

2. The air without, having been made and kept pure, its abundant admission to the interior of every dwelling, is the next most important object for which public hygiene provides. The human body is noxious to itself and others, if not washed constantly by streams of pure air. In vain will malaria be excluded if, in shutting them out, the body remains imprisoned amid its own impalpable, but none the less dangerous emanations. Every individual loses through the lungs and skin between two and four pounds daily, in water holding, in solution the products of decomposition, which are the necessary result of all living activity. Could these products be precipitated in a palpable, visible form in the air which they pollute, like the particles of carbon from a smoking lamp, the air surrounding us in unventilated apartments, would form a dense, black cloud, which would hide all objects from our sight, and conceal our own bodies from the eyes of our friends, as a cuttle-fish is hidden in his own inky secretion. The beds in which we sleep, when not aired, the clothes which we wear, when unrenewed, and the very walls of our rooms, when unventilated, would have a sooty complexion; we would be invested with a funereal blackness, a symbol of the peril of our lives. A steady current or frequent tides of air are necessary to avoid the danger which this blackness would represent, for there is no poison so wide-spread which so decidedly depresses all the vital functions and furnishes the requisite pabulum for the germs of disease, as that which accumulates in the air, through overcrowding or defective ventilation. The study of Typhus Fever, Cholera, and of contagious diseases, generally, proves this to be a fatal reality. Open fire-places, communicating with heated chimneys, furnish the simplest and best possible ventilation. Hot-air furnaces, if they receive their supply of air from a pure source, and not from a foul cellar, supply a steady current. Rooms warmed by radiant heat from stoves or pipes, should be provided with ventilators, communicating with an ascending current of heated air. Our public schools are under the eye of the Boards of Health and of Education, but examples have fallen under the notice of this Bureau, of overcrowding and defective ventilation in private schools, indicating that all such institutions should be under supervision. Factories and workshops, likewise, ought to receive frequent inspection. The tenement-houses of the Metropolitan District will task all the resources of the Board to wipe out their reproach on our civilization.

3. The essential conditions of all animal life are air, nutritive material and heat. The first of these having been secured free from taint, the subsistence of the masses of a great city's population demands watchfulness. During the past summer we have seen the cupidity of butchers and owners of cattle endeavoring to force on our markets meat made dangerous by a contagious and rapidly fatal disease, a disease which, from its first symptoms in the animals affected, could but have rendered the flesh unfit for food. We are not sufficiently acquainted with the results which follow the use of animal food which has undergone vitiation by disease. We know that a most dangerous and fatal poison may be produced, artificially, and is often pro-

duced accidentally, by the putrefaction of meat, and that the dangerous properties of all these substances are not destroyed by the gastric juice. There is a subtlety and virulence in poisons resulting from putrefaction, which characterize those produced by disease as well. The intimate nature of the disorders which destroy life is, to a great extent, not understood. How many of our most experienced and best educated physicians are compelled to confess their inability to determine the cause of death in many cases which they have had under observation? In addition to well recognized maladies, how large is the class of mysterious affections of which science has not yet determined the characteristic symptoms? It is easy to give a name to the most unusual and doubtful disorder, but the most advanced intellects of the profession lament the amount of uncertainty hidden under even the most familiar medical terms. In this domain a wide field still remains to be cultivated, in order to be able to trace disease and death to their real causes in the injurious influences to which we are constantly exposed. How large a share adulterated, decomposed and diseased aliment may have in our bodily sufferings we may imagine, but we cannot confidently assert. The milk, flour, meat, tea, beer, sugar, in fact nearly all the most indispensable articles of nutrition, and the compounds made from them, are liable to adulteration, to the deterioration resulting from putrefaction, disease or parasitic contamination. Many of these vitiations are difficult of detection, and the poor are the chief sufferers from the fatal cupidity or indifference of dealers. Hence, competent inspectors should watch these supplies of our city; the fear of detection would prevent many shameful adulterations, and whole cargoes, as full of plagues as Pandora's box, would be confiscated and destroyed. The presence of inspectors at the abattoirs of New York and Brooklyn, during the epidemic disease among cattle last summer, prevented many infected carcasses from finding their way into the markets.

The Croton and Ridgewood waters are submitted to weekly analyses, in order to detect possible sources of impurity, but wells and cisterns, from which water is drawn for culinary purposes and for drinking, ought to be inspected and secured from contamination. During the past summer I witnessed the dangerous illness of an entire family caused by a polluted well of water, and, doubtless, many other families suffered in a similar manner from a like cause, which eluded observation.

It is only by persistent appeals to the public sense and conscience that truths like the foregoing can be made current coin; they are the teachings of our statistical calculations, and more eloquent to popular apprehension than the most ingenious combinations of numerals. Such truths, when made plain to the public, are readily translated into legislation and action, and the enforcement of a wise sanitary code, with all requisite works of public improvement, follows as a necessary result.

Yours, very respectfully,

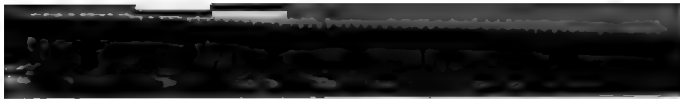
R. CRESSON STILES,

Deputy Registrar Metropolitan Board of Health.

Consolidated Abstract of Deaths in Brook lyn, from all Causes, Registered in the Year ending December 31st, 1868.

CAUSES OF DEATH.															MALES.															Total.
Under 1 year.	1-2	2-3	3-4	4-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-100	Native.	Foreign.					
CLASS I.—ZYMOTIC.																														
ORDER I. (MIASMATIC DISEASES).																														
Small Pox.....	3	8	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Measles.....	14	42	55	43	35	53	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	13	1	14				
Scarlatina.....	10	19	17	11	3	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	247	5	252				
Diphtheria.....	11	23	11	8	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	69	2	71				
Croup.....	11	23	11	8	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	61	2	61				
Quincy.....	41	18	6	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Whooping-Cough.....	41	18	6	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	69	2	71				
Typhus Fever.....	11	2	1	1	1	1	1	2	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	6	6	12				
Typhoid Fever.....	11	2	1	1	1	1	1	2	1	1	1	1	4	1	2	1	1	1	1	1	1	1	1	29	31	60				
Erysipelas.....	27	30	7	2	1	1	1	2	1	1	1	1	3	1	2	1	1	1	1	1	1	1	1	18	9	27				
Dysentery.....	27	30	7	2	2	8	3	1	1	1	1	2	3	2	2	1	1	2	2	1	1	1	1	82	21	103				
Diarrhoea.....	27	30	7	2	2	8	3	1	1	1	1	3	2	2	1	1	2	3	1	1	1	1	1	138	12	150				
Cholera Morbus.....	2	2	1	1	1	2	1	1	1	1	2	3	3	1	2	1	2	3	1	1	1	1	1	8	15	23				
Cholera Infantum.....	395	193	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	594	8	603				
Cerebro-Spinal Meningitis.....	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	6				
Intermittent Fever.....	3	2	3	2	1	1	1	2	1	1	1	1	3	5	1	1	1	1	1	1	1	1	1	5	2	7				
Remittent Fever.....	3	2	3	2	1	1	1	2	2	3	1	3	3	5	1	1	1	1	1	1	1	1	1	28	12	40				
Pyæmia.....	3	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	6	9				
Carbuncle.....	3	2	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				
Total Miasmatic.....	607	379	117	71	52	91	28	11	17	18	13	17	16	14	24	7	8	5	5	6	2	3	1	1	1,380	131	1,511			

CAUSES OF DEATH.																	FEMALES.																	Total of both Sexes.	Percentage of each class on Total.																				
																	Under 1 year.	1-2	2-	3-	4-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85-	90-	95-	100-	Native.	Foreign.	Total.											
SS. 11.—CONSTITUTIONAL DISEASES.																																																							
Under 1. (DIATHATIC DISEASES.)																																																							
Anæmia.....																											2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1								
Anomalism.....																																																							
Dropsy.....																	1																																						
Cancer.....																																																							
Cancer of Breast.....																																																							
Cancer of Liver.....																																																							
Cancer of Rectum.....																																																							
Cancer of Stomach.....																																																							
Cancer of Mouth.....																																																							
Cancer of Neck.....																																																							
Cancer of Face.....																																																							
Cancer of Bladder.....																																																							
Cancer of Uterus.....																																																							
Cancer of Testis.....																																																							
Cancer of Penis.....																																																							
Cancer of Ovary.....																																																							
Cancer of Uterus.....																																																							
Rachitis.....																	1																																						
Leucocythemia.....																																																							
Total Diathetic.....																	3				3		3	2	1	4	2	3	11	17	16	13	4	14	9	7	2	1					63	70	132	293	2.31								
Under 2. (TUBERCULAR DISEASES.)																																																							
Scrofula.....																	2	6					1	3	2	1	2																												
Myxomata.....																	136	47	5	4	1	3	1																																
Pneumonia.....																	17	7	4	5	1	10	9	40	54	72	63	66	52	36	19	17	14	4	5	2																			
Phthisis.....																	40	32	6	4	3	3																																	
Hydrocephalus.....																	8	5	4		4	3																																	
Tubercular Meningitis.....																																																							
Caries of Spine.....																																																							
Hip Joint Disease.....																																																							
Total Tubercular.....																	203	97	19	13	10	22	12	41	68	72	64	67	53	38	19	18	20	14	5	2									585	297	882	1,821	20.91						
Total Constitutional Class.....																	206	97	10	10	10	26	14	42	92	74	67	78	70	53	35	31	21	14	12	4	1								617	367	1014	2023	23.12						



CAUSES OF DEATH.													FEMALES.													Total of both Sexes.	Percentage of each Cause on Total.		
Under 1 year.	1-2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Native.	Foreign.			Total.	
CLASS III.—LOCAL.																													
ORDER 1. (NERVOUS DISEASES.)																													
24	15	7	2	4	7	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	63	7	70	172	1.87	
1											1	1	1	1	1	1	1	1	1	1	1	1	1	5	2	4	6	.07	
											1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4	23	.26	
											1	1	1	1	1	1	1	1	1	1	1	1	1	20	37	57	116	1.33	
											1	1	1	1	1	1	1	1	1	1	1	1	1	19	17	36	57	.65	
											1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	4	2	.02	
											1	1	1	1	1	1	1	1	1	1	1	1	1	5	3	8	14	.17	
											1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	6	36	41	.41
140	29	15	4	3	3					1	1													193	4	197	441	5.04	
11																								11		11	23	.26	
27	11	9	2	1	8	2	1	2	4		1	1	1	1	1	1	1	1	1	1	1	1	1	67	8	75	163	1.87	
	1																							1		1	1	.01	
203	56	31	8	8	20	7	6	7	14	5	11	11	13	5	4	15	14	13	6	8	2			398	87	476	1,054	1,205	
ORDER 2. (CIRCULATORY SYSTEM.)																													
											1	1												2	4	6	19	.22	
																								1	1	1	4	.04	
																								20	13	33	69	.78	
																								46	47	93	174	1.99	
1			1	1	5	8	1	9	2	3	7	5	8	6	12	6	8	4	3	1							1	.01	
1			1	1	8	11	4	11	10	6	11	7	8	11	6	8	8	4	3	4				68	65	133	266	3.04	

Deaths in Brooklyn—Continued.

MALES.

CAUSES OF DEATH.																															
Under 1 year.	1-	2-	3-	4-	5-	10-	11-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85-	90-	95-	100-	Native.	Foreign.	Total.				
CLASS III.—Continued.																															
ORDER 6. (URINARY SYSTEM.)																															
Nephritis.....	1	.....	1	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nephritis.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nephritis.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cystitis.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Diabetes.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stones in Bladder.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stricture of Urethra.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Urinary System.....	1	.....	4	1	2	1	3	5	6	6	9	11	3	2	5	4	3	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ORDER 7. (LOCOMOTOR SYSTEM.)																															
Arthritis.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Neuritis.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Locomotor System.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ORDER 8. (INTEGUMENTARY SYSTEM.)																															
Phlegmon.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Skin Diseases.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Integumentary System.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Local Diseases.....	450	123	40	33	44	26	10	27	39	48	59	61	72	66	60	44	41	31	37	9	7	3	1

CAUSES OF DEATH.	FEMALES.																								Total of both Boxes.	Percentage of each Cause on Total.		
	Under 1-3 years.	3-4	4-5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-	Native.			Foreign.	Total.
CLASS III.—Continued.																												
ORDER 5. (URINARY SYSTEM.)																												
Nephritis	1	1	2	1	1	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	7	2	9	17	.20
Nephritis	4	1	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19	11	30	89	1.03
Cystitis	9	.16
Diabetes	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	2	.07
Stone in Bladder	1	.01
Stricture of Urethra	1	.01
Total Urinary Diseases.....	1	1	2	1	6	1	.....	.....	.....	.....	6	2	1	1	.....	.....	2	2	1	.....	.....	.....	.....	28	13	41	123	1.40
ORDER 6. (GENERATIVE SYSTEM.)																												
Ovarian Tumor
Metritis
Total Generative Diseases.....
ORDER 7. (LOCOMOTOR SYSTEM.)																												
Arthritis
Necrosis
Total Locomotory.....
ORDER 8. (INTEGUMENTARY SYSTEM.)																												
Phlegmon
Ulcer
Skin Diseases
Total Integumentary
Total Local Diseases.....
Total.....	343	117	60	23	17	53	27	21	47	52	47	51	50	38	30	41	42	42	31	18	8	3	.....	877	359	1236	2644	30.22

CAUSES OF DEATH.	FEMALES.																				Total both Sexes.	Percentage of each Cause on Total.									
	Under 1 year.	1-3	3-4	4-5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84			85-89	90-94	95-99	100-	Native.	Foreign.	Total.		
CLASS IV.—DEVELOPMENTAL.																															
ORDER 1. (CHILDREN.)																															
Premature Birth.....	8																									84		84	186	2.14	
Cyanosis	10																									10		10	36	.41	
Spina Bifida.....	2																									2		2	4	.04	
Other Malformations.....	16																									16		16	44	.50	
Teething.....	13	7	1																							20	1	21	40	.48	
Umbilical Hemorrhage.....	1																									1		1	4	.04	
Total Children.....	126	7	1																							133	1	134	314	3.59	
ORDER 2. (WOMEN.)																															
Childbirth.....						2	6	4	3	1																5	10	15	15	.18	
Convulsions (Puerperal).....						1	5	2	3	2	1															11	5	16	16	.19	
Flooding.....						4	3	1																		3	6	9	9	.10	
Mania Puerperal.....						2	1																			2	1	3	3	.03	
Phlegmasia dolens.....						1																				1	1	2	2	.02	
Total Women.....						9	12	7	4	1																22	23	45	45	.51	
ORDER 3. (Old Age.)																															
																		1	7	18	33	32	20	10		3		84	134	188	2.16
ORDER 4. (DEBILITY.)																															
	62	5	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	75	16	91	212	2.42	
Total Developmental Diseases.....	188	12	1	1	1	10	13	11	7	4	2	3	4	3	4	4	4	1	1	1	1	1	1	1	3	280	134	404	739	8.67	

CAUSES OF DEATH.

FEMALES.

CAUSES OF DEATH.		FEMALES.																										Total both Sexes.	Percent. of each Cause on Total.	
Under 1 year.	1-3	2-	3-	4-	5-	10-	15-	20-	25-	30-	35-	40-	45-	50-	55-	60-	65-	70-	75-	80-	85-	90-	95-	100-	Native.	Foreign.	Total.			
CLASS V.—VIOLENCE.																														
ORDER 1. (ACCIDENT AND NEGLIGENCE.)																														
	1	3				2	2					1				1	1								7	4	11	82	.04	
Fractures and Contusions																													.03	
Wounds—gun-shot																													.01	
Wounds—penetrating																													.57	
Burns and Scalds	6	3	2	1	1	1	2		1	3															15	5	20	99	.02	
Poison by Lead																													.02	
Poison by Opium	1																								1		1	1	.01	
Poison by Phosphorus																									1		1	1	.02	
Drowning	1					1	1			2	1	1													5	4	9	72	.83	
Suffocation											1																1	1	17	.20
Exposure																													.02	
Total by Accidents and Negligence	3	5	6	3	2	5	4	2	1	6	1	2			1	1	1								29	16	43	232	2.65	
ORDER 3. (MURDER)																														
ORDER 4. (SUICIDE.)																														
Gun-shot																													.08	
Cut.																													.03	
Poison																													.08	
Hanging																													.04	
Drowning																													.07	
Total Suicides																													.30	

Return of Deaths in the City of Brooklyn, for the three Months ending June 30th, 1888.

MONTHS.		Males.	Females.	Not stated.	Total.	United States.	Foreign.	Not stated.	Total.
April.....		343	283	.....	626	460	165	.....	625
May.....		275	310	.....	585	408	177	.....	585
June.....		249	284	.....	533	385	148	.....	533
Total.....		867	876	.....	1,743	1,253	490	.....	1,743

MONTHS.	1-2	2-	3-	4-	5-	10-15-	20-25-	30-35-	40-45-	50-55-	60-65-	70-75-	80-85-	90-95-	95-100-	Total.										
April.....	146	56	43	23	18	30	5	12	27	80	31	31	25	22	20	25	17	17	10	10	5	3	1	.....	.....	525
May.....	143	48	36	20	18	36	12	8	28	26	30	31	30	19	33	15	13	10	10	12	7	1	1	2	1	585
June.....	142	56	26	9	10	31	13	9	29	38	36	19	21	16	18	15	17	12	14	8	5	2	3	.....	.....	533
Total.....	431	160	105	52	44	87	30	29	84	103	87	81	76	57	61	55	47	48	34	39	20	6	4	2	1	1,743

Returns of Deaths in the City of Brooklyn, for the three Months ending December 31st, 1888.

MONTHS.		Males.		Females.		Not stated.	Total.	United States.	Foreign.	Not stated.	Total.
October.....		350		337		2	687	496	199	3	698
November.....		315		244		.....	559	376	183	.....	559
December.....		281		233		1	516	367	149	.....	516
Total.....		955		814		3	1,773	1,239	531	3	1,773

585

		MONTHS.														Under 1 year.											
		1-2	2-3	3-4	4-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95	95-100	Total.		
October.....	181	110	34	16	16	19	14	14	23	33	30	27	23	33	25	19	20	17	15	13	11	2	2	....	1	698
November.....	132	61	20	14	9	26	11	15	29	28	25	31	26	32	21	17	17	8	14	10	9	2	2	.....	.....	559
December.....	135	43	30	16	14	24	6	9	27	15	18	20	26	17	18	20	11	19	17	14	8	4	2	2	1	516	
Total.....	448	214	84	46	39	69	31	38	79	76	73	78	75	82	64	56	48	44	46	37	28	8	6	2	2	1,773	

DEATHS FROM ZYMOTIC DISEASES.

BROOKLYN.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHOICAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the Quarter ending March 31st, 1888.

WARDS.

WARDS.	Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-Cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Other Diarrhoeal Diseases.	Other Zymotic Diseases.	Total deaths from Zymotic Diseases.	Deaths by Accident or Negligence.	Total Deaths from all Causes.	Total Population (in wards), Census of 1885.	Percentage of Deaths from Zymotic Diseases on the Total Mortality.	Death-rate per 1,000 Annually from Zymotic Causes.	Death-rate per 1,000 Annually from all Causes.
First.	1	9	9	6	1	1	1	1	1	1	1	1	9	1	80	8,128	30.	6.98	19.83
Second.	1	6	6	6	4	2	1	1	1	1	1	1	17	1	59	8,760	39.31	7.70	26.43
Third.	1	6	6	6	1	1	1	1	1	1	1	1	7	1	59	8,760	39.31	7.70	26.43
Fourth.	1	12	12	12	1	1	1	1	1	1	1	1	16	1	55	11,506	37.27	5.21	19.12
Fifth.	1	14	14	14	1	2	1	1	1	1	1	1	29	2	101	17,820	23.71	6.30	22.67
Sixth.	2	18	18	18	1	2	1	1	1	1	1	1	40	4	173	25,407	23.26	6.06	20.03
Seventh.	1	6	6	6	1	1	1	1	1	1	1	1	14	1	60	15,908	30.29	3.51	17.39
Eighth.	1	2	2	2	1	1	1	1	1	1	1	1	8	1	40	9,920	16.83	3.26	19.94
Ninth.	1	19	19	19	4	1	1	1	1	1	1	1	41	1	160	23,443	37.33	6.90	25.69
Tenth.	4	21	21	21	4	2	1	1	1	1	1	1	34	1	165	28,058	33.03	6.83	22.63
Eleventh.	1	30	30	30	2	2	2	1	1	1	1	1	38	1	148	18,242	29.73	8.65	32.43
Twelfth.	3	15	15	15	2	2	1	1	1	1	1	1	23	1	85	13,083	32.74	8.66	25.68
Thirteenth.	1	16	16	16	2	2	1	1	1	1	1	1	23	1	84	17,791	31.43	4.06	18.89
Fourteenth.	1	3	3	3	2	2	1	1	1	1	1	1	13	1	101	16,423	21.73	5.71	26.19
Fifteenth.	1	3	3	3	2	2	1	1	1	1	1	1	13	1	101	16,423	21.73	5.71	26.19
Sixteenth.	1	6	6	6	2	2	1	1	1	1	1	1	18	2	80	11,449	22.50	6.29	27.95
Seventeenth.	1	30	30	30	1	2	1	1	1	1	1	1	46	1	228	24,370	23.95	10.83	37.41
Eighteenth.	1	4	4	4	1	1	1	1	1	1	1	1	7	1	50	10,234	12.50	3.13	25.04
Nineteenth.	2	4	4	4	1	1	1	1	1	1	1	1	12	2	42	8,033	23.67	7.93	27.26
Twentieth.	1	5	5	5	2	2	1	1	1	1	1	1	12	1	48	8,055	27.91	5.96	21.85
Total deaths from these diseases in all the Wards.	1	22	230	45	49	29	3	21	1	13	63	409	40	1,855	296,112	25.28	6.34	35.03	

DEATHS FROM ZYMOTIC DISEASES.

BROOKLYN.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOID FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHEAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the Quarter ending June 30th, 1893.

WARDS.

WARDS.															Total Deaths from these Diseases in all the Wards.....		1		5		133	
Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-Cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.	Other Diarrheal Diseases.	Other Zymotic Diseases.	Total Deaths from Zymotic Diseases.	Deaths by Accident or Negligence.	Total Deaths from	Total Population Census of 1895.	Percentage of Deaths from Zymotic Diseases on Mortality.	Death-rate per 1,000 from Zymotic Causes.	Death-rate per 1,000 from all Causes.				
First.....	6	1	.....	.....	1	.....	.....	3	1	1	13	.....	53	6,128	24.21	8.49	24.80	
Second.....	6	.....	58	8,760	10.51	2.74	26.48				
Third.....	4	.....	40	8,890	10.51	17.79	18.				
Fourth.....	17	.....	72	11,508	23.61	5.91	24.68				
Fifth.....	14	.....	93	17,820	15.05	3.14	20.88				
Sixth.....	27	.....	172	26,407	21.51	5.60	26.65				
Seventh.....	10	.....	72	15,968	13.89	2.51	18.04				
Eighth.....	6	.....	57	9,829	10.53	2.44	23.19				
Ninth.....	29	.....	151	23,443	19.21	4.95	25.76				
Tenth.....	29	.....	146	28,668	10.86	4.05	20.37				
Eleventh.....	24	.....	105	18,242	22.86	5.28	23.02				
Twelfth.....	17	.....	85	13,085	20.	5.19	25.98				
Thirteenth.....	16	.....	96	17,791	16.67	3.59	21.58				
Fourteenth.....	26	.....	109	15,425	23.85	6.74	28.25				
Fifteenth.....	9	.....	50	11,440	18.	3.15	17.38				
Sixteenth.....	34	.....	183	24,379	18.58	5.58	30.03				
Seventeenth.....	14	.....	45	10,234	23.	6.26	25.04				
Eighteenth.....	5	.....	45	8,053	11.11	3.30	28.70				
Nineteenth.....	11	.....	55	6,055	20.76	5.46	26.32				
Twentieth.....	9	.....	62	13,980	14.52	2.58	17.74				
Total Deaths from these Diseases in all the Wards.....															290,112	18.52	4.46	23.53				

DEATHS FROM ZYMOTIC DISEASES.

NOTE.—DEATHS FROM SMALL POX, MEASLES, SCARLATINA, DIPHTHERIA, WHOOPING-COUGH, TYPHOUS FEVER, TYPHUS FEVER, CHOLERA, CHOLERA INFANTUM, DIARRHEAL MALADIES AND OTHER ZYMOTIC DISEASES.

Registered during the quarter ending Saturday, December 31st, 1888.

WARDS.	Deaths by Accident or Negligence.										Total Deaths from all Causes.	Total Population Census of 1865.	Percentage of Deaths from Zymotic Diseases on Total Mortality.	Death-rate per 1,000 from Zymotic Causes.	Death-rate per 1,000 from all Causes.			
	Small Pox.	Measles.	Scarlatina.	Diphtheria.	Croup.	Whooping-Cough.	Typhus Fever.	Typhoid Fever.	Cholera.	Cholera Infantum.						Other Diarrhoeal Diseases.	Other Zymotic Diseases.	
First.....	1	1	1	1	1	1	1	1	1	1	1	1	8	20	6,125	40.	5.24	13.06
Second.....	1	1	1	1	1	1	1	1	1	1	1	1	9	50	8,760	18.	4.12	22.83
Third.....	1	1	1	1	1	1	1	1	1	1	1	1	11	43	8,890	12.50	89	7.20
Fourth.....	1	1	1	1	1	1	1	1	1	1	1	1	11	103	11,506	25.58	3.92	14.95
Fifth.....	1	1	1	1	1	1	1	1	1	1	1	1	24	151	17,820	23.80	5.39	23.12
Sixth.....	1	1	1	1	1	1	1	1	1	1	1	1	45	151	20,407	29.80	6.82	22.87
Seventh.....	1	1	1	1	1	1	1	1	1	1	1	1	19	80	15,968	23.75	4.76	20.01
Eighth.....	1	1	1	1	1	1	1	1	1	1	1	1	19	68	9,829	27.94	7.73	27.67
Ninth.....	1	1	1	1	1	1	1	1	1	1	1	1	50	164	23,443	30.12	8.53	27.98
Tenth.....	1	1	1	1	1	1	1	1	1	1	1	1	41	180	28,668	22.77	5.72	25.12
Eleventh.....	1	1	1	1	1	1	1	1	1	1	1	1	19	96	18,242	19.79	4.17	21.05
Twelfth.....	1	1	1	1	1	1	1	1	1	1	1	1	30	110	13,085	27.27	9.17	33.63
Thirteenth.....	1	1	1	1	1	1	1	1	1	1	1	1	15	78	17,791	19.23	3.37	11.92
Fourteenth.....	1	1	1	1	1	1	1	1	1	1	1	1	31	123	15,425	25.20	8.04	31.49
Fifteenth.....	1	1	1	1	1	1	1	1	1	1	1	1	30	123	15,425	25.20	8.04	31.49
Sixteenth.....	1	1	1	1	1	1	1	1	1	1	1	1	33	155	11,419	37.97	10.48	27.60
Seventeenth.....	1	1	1	1	1	1	1	1	1	1	1	1	19	64	10,234	29.69	7.45	25.01
Eighteenth.....	1	1	1	1	1	1	1	1	1	1	1	1	13	49	6,053	26.53	8.59	32.88
Nineteenth.....	1	1	1	1	1	1	1	1	1	1	1	1	15	68	6,055	22.06	7.45	33.77
Twentieth.....	1	1	1	1	1	1	1	1	1	1	1	1	16	76	13,980	21.05	4.58	21.75
Total Deaths from these Diseases in all the Wards.....	2	2	2	2	2	2	2	2	2	2	2	2	449	1,773	206,112	24.76	6.07	23.95

Report of Marriages in the City of Brooklyn and County of Kings, for the Three Months ending March 31st. 1868.

MONTHS.	TOTAL.	COLOR.		NATIVITY.				CONDITION.							
				FOREIGN.		NATIVE.		NOT STATED.		SINGLE.		MARRIED.		NOT STATED.	
		Black.	White.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
January.....	234	2	252	55	49	64	69	8	9	91	101	21	17	15	9
February.....	194	....	194	31	41	53	50	6	6	78	80	11	8	8	9
March.....	220	....	220	48	43	56	59	6	8	75	72	20	19	15	19
Total.....	668	2	666	141	133	173	178	20	23	244	253	52	41	38	37

MONTHS.	UNDER 20 YEARS.												NOT STATED.											
	20-25.		25-30.		30-35.		35-40.		40-45.		45-50.		50-55.		55-60.		60-65.		65-70.		NOT STATED.			
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.		
January	1	25	36	52	42	22	18	13	10	2	5	4	5	1	3	2	1	2	1	..	..	5	4
February .....	..	17	37	52	31	16	16	4	2	2	3	2	..	1	..	..	..	2	..	..	..	3	4
March	1	23	38	43	31	24	18	7	9	7	2	3	4	..	3	..	2	..	..	..	..	2	3
Total.....	2	65	111	147	104	62	52	24	21	11	10	9	11	1	7	2	3	2	3	..	..	10	11

Report of Marriages in the City of Brooklyn and County of Kings, for the Three Months ending September 30th, 1888.

AGE.	SEX.	Total.	COLOR.		NATIVITY.				CONDITION.			
					FOREIGN.		NOT STATED.		SINGLE.		MARRIED.	
			Black.	White.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
July.....		170	4	166	90	68	77	99	3	3	132	129
August.....		155	5	150	82	83	64	61	5	6	99	100
September.....		230	3	227	116	104	112	122	2	4	164	160
Total.....		555	12	543	298	260	257	242	10	13	396	389

MONTHS.	UNDER 20 YEARS.		20-25.		25-30.		30-35.		35-40.		40-45.		45-50.		50-55.		55-60.		60-65.		65-70.		70-75.		NOT STATED.
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
July.....	5	40	78	82	41	32	23	8	13	3	2	1	1	3	3	2	1	2	1	2	1	1	1	5	4
August.....	3	37	65	66	48	27	12	9	13	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
September	4	42	79	118	85	40	31	12	12	8	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Total.....	12	119	222	266	174	99	66	29	33	16	10	7	7	7	7	7	7	7	7	7	7	7	7	10	10

Return of Still-Births in the City of Brooklyn for the Year ending December 31st, 1888.

January.....	83	May.....	80	September.....	68	December.....	56
February.....	59	June.....	81	October.....	41	Total.....	759
March.....	56	July.....	46	November.....	57		
April.....	42	August.....	80				

Return of Births in the City of Brooklyn, for the year ending September 30th, 1898.

MONTHS.	TOTAL.	COLOR.		SEX.		NATIVITY OF PARENTS.				
		White.	Black.	Male.	Female.	Foreign.	Native.	Foreign Father only.	Foreign Mother only.	Not stated.
1897.										
October.....	498	495	3	255	243	197	200	48	32	1
November.....	443	434	9	222	221	199	159	51	32	2
December.....	408	403	5	200	199	173	155	52	24	.....
Total.....	1,349	1,332	17	657	602	568	514	171	92	3
1898.										
January.....	505	500	5	265	240	229	179	58	30	9
February.....	425	420	5	233	192	170	181	42	29	3
March.....	452	442	10	241	211	203	172	49	25	3
Total.....	1,382	1,362	20	739	643	602	532	149	84	15
April.....	378	372	6	183	195	171	152	29	23	3
May.....	380	371	9	181	199	155	181	40	24	.....
June.....	381	376	5	192	189	151	153	45	26	3
Total.....	1,139	1,119	20	550	583	480	465	114	73	6
July.....	396	390	6	215	181	178	142	54	22	.....
August.....	400	395	2	205	195	195	147	33	22	3
September.....	399	394	6	203	195	192	145	34	27	1
Total.....	1,195	1,182	13	623	572	565	434	121	71	4
				2,005	2,400	2,215	1,946	555	320	29

Appended Statement No. I.

Meteorological Observations, by Weeks, for the Twelve Months ending December 31st, 1868. Condensed from the Daily Observations of Jonas P. Leides, M. D., Physician to the Eastern Dispensary.

DATE.	Mean Temperature (Fahrenheit Scale.)	Greatest range of Temperature in the week.	Average Humidity, Saturation being 100.	Total Rain-fall (Inches of water.)	Mean Pressure of the Atmosphere.	Remarks Concerning the Winds and other Aspects of the Weather.
Week ending—						
Eleven days ending Jan. 11...	27°	3-40°	64	1.30	29.78	The year began with a hail and snow storm. The remainder of these eleven days were variable, with great range of temperature.
January 18.....	19	10-32	60	.25	30.02	This week had four clear days. About three inches of snow fell on the 15th.
January 25.....	28	16-38	71	1.15	29.99	Alternately clear, rainy and foggy, with fresh winds and three rainy days.
February 1.....	23	10-40	74	1.00	30.09	Very cloudy; one foot of snow during the week; barometer very high.
Average for 4½ weeks.....	24	3-40	67	3.70	29.99	The month was exceedingly disagreeable and cold, with heavy snow-falls, sharp and winds, and an average humidity 4° higher than the mean of the corresponding month last year.

Meteorological Observations—Continued.

DATE.	Mean Temperature (Fahrenheit Scale.)	Greatest range of Temperature in the week.	Average Humidity, Saturation being 100.	Total Rain-fall (Inches of water.)	Mean Pressure of the Atmosphere.	Remarks Concerning the Winds and other Aspects of the Weather.
Week ending—						
February 8.....	16°	0-36°	64	.39	30.11	Variable sky, but steadily and unusually cold. The 3d was the coldest day of the winter, the thermometer ranging from 0-10°.
February 15.....	23	7-43	64	.70	30.11	A clear cold week, with light and moderate gales, and very dry.
February 22.....	29	20-54	68	.24	29.95	This week was remarkable for the warmest and one of the coldest days of winter. On Friday, the 21st, the thermometer ranged from 21-84°, but the temperature fell very rapidly during the next day.
February 29.....	20	-5-35	64	.65	30.13	Very cloudy. On Sunday, the 23d, the coldest day of winter, the temperature ranged from -5-11°. Snow fell on four days of the week.
Average for four weeks....	22	-5-54	65	1.98	30.08	The coldest February that has been experienced in this latitude in many years. The mean pressure of the atmosphere very high.
March 7.....	21	0-51	59	1.00	29.97	Variable sky, with fresh winds. A north-east gale on the 2d. Thermometric range excessive. Mean temperature 11° lower than corresponding week last year.
March 14.....	43	29-57	75	.50	30.10	Alternately clear, cloudy, rainy, windy and foggy.
March 21.....	41	23-62	76	1.48	29.83	A variable week. Rain and sunshine alternating on five days. Severe gale and snow-storm on the 21st. About 16 inches of snow fell from 1 a. m. to 9 p. m.
March 28.....	38	24-54	64	.00	29.90	A very clear week, with fresh winds on almost every day. A light hail and rain-storm on the 28th.
Average for four weeks....	35	0-62	68	2.98	29.96	These four weeks averaged unusually cold, and were stormy. The range of thermometer was very great. The mean temperature was 2° higher than that of March, 1867.

April 4.....	45	30-68	67	.39	29.87	<p>A variable and windy week. Tempest of wind and rain on the 2d. Temperature fell 20° in two hours. Light gale and snow-storm, with cold fresh wind, on the 4th, which continued until 5 A. M. on the 5th.</p> <p>Variable sky, with fresh winds. North-east rain-storm on the 7th. Rain and melted snow for the week of unusual depth.</p> <p>Cold, cloudy and showery, with one fine, fresh, invigorating day.</p> <p>Sky, temperature and winds very variable—thermometer ranging 40° within three days.</p> <p>Winds variable, but mostly fresh throughout the week.</p> <p>The weather continued cold and variable throughout the month, with fresh winds and a considerable rain-fall. The month was 8° colder and 23° damper than the corresponding month last year.</p>
April 11.....	32	22-45	63	2.76	29.89	
April 18.....	46	22-68	77	1.50	29.97	
April 25.....	49	32-72	80	1.25	30.16	
May 2.....	50	35-71	70	1.00	30.01	
Average for five weeks.....	44	22-72	71	6.79	29.98	
May 9.....	51	37-64	74	1.40	29.77	<p>Very cloudy, with moderate winds and light rains. Hard thunder-storm on the 7th.</p> <p>Very damp week, with light rains, fresh winds and variable sky. Rain-fall on the 13th nearly one inch deep.</p> <p>A very damp, rainy, foggy and disagreeable week. The highest average humidity of any week in the year.</p> <p>A very cloudy and foggy week. Winds variable, and rain on five days.</p> <p>These four weeks were exceedingly wet and cloudy. The atmospheric pressure ranges quite low, and the rain-fall was excessive.</p>
May 16.....	55	43-70	70	2.25	29.99	
May 23.....	56	45-73	80	3.40	29.79	
May 30.....	61	43-74	84	.34	29.82	
Average for four weeks.....	56	37-74	78	7.29	29.84	
June 6.....	65	52-76	67	.14	30.11	<p>Showery, with sultry periods, closing with the warmest day since September 7th, 1887.</p> <p>A week of heavy rains, with two thunder storms and but one clear day.</p> <p>Alternately rainy, cloudy and sultry, with variable winds and the warmest day since July 4th, 1887.</p> <p>Mostly clear, with the driest and finest day for many weeks. Thunder-storm on the 24th from 11½ A. M. to 6 P. M.</p> <p>The mean temperature for the month was exactly the same as the corresponding month last year. A showery period, alternately cloudy and sultry, with variable winds.</p>
June 13.....	64	53-76	83	2.45	30.03	
June 20.....	73	62-92	74	.11	29.93	
June 27.....	70	60-86	60	.80	30.00	
Average for four weeks.....	68	52-92	71	4.60	30.02	

September 5.....	76	58-64	72	6.68	30.08	Variable winds and cloudy skies during the entire week. The heaviest rain-storm ever known by Dr. Lothrop occurred on the 4th. Very variable week, with cloudy days and sultry showers. Four days with light rains and fresh winds. The remainder of the week dry, fine, fresh and cool. A very cloudy and rainy week, with variable winds. <i>In these four weeks the total rain-fall exceeded all previous experience in this latitude. Temperature 4° warmer than the average of corresponding period in 25 years.</i>
September 12.....	74	55-61	76	.31	29.99	
September 19.....	63	41-52	58	.15	30.16	
September 26.....	60	46-50	79	4.00	29.99	
Average for four weeks.....	68	41-54	71	11.14	30.04	
October 3.....	58	50-72	69	.53	30.06	Alternately rainy and clear, with light and variable winds.
October 10.....	56	44-76	65	.30	30.04	A clear week with cool winds, and a few snow-flakes on the 9th.
October 17.....	55	34-70	62	.50	30.06	A fine, invigorating week, with light rains and moderate gales of wind, and the coolest day since April.
October 24.....	46	33-60	65	.70	30.16	Variable sky, light rains, fresh winds, and a light snow-storm on the 19th, were the chief characteristics of this week.
October 31.....	48	32-65	63	.25	30.18	The early part of the week was cloudy, with light rains; the latter part clear, with fresh winds.
Average for five weeks.....	53	32-76	65	2.28	30.10	Five weeks of comparatively pleasant weather—cool, invigorating, and Indian summer like.
November 7.....	44	32-60	63	2.60	29.95	This week had one fine, one cool, two hazy and three rainy days.
November 14.....	46	30-69	61	1.00	30.13	The early part of the week was characterized by a light snow-storm and light rains; the remainder was clear with fresh winds.
November 21.....	39	30-50	63	1.95	29.92	Mostly cloudy, with fresh winds and light rains. A few snow-flakes fell at 2 P. M. on the 21st.
November 28.....	40	31-53	59	.70	29.90	A fine, clear week, with variable skies and fresh winds.
Average for four weeks.....	42	30-69	61	6.25	29.97	<i>These four weeks partook of the characteristics of the most delightful autumn and the average inclemency of winter weather.</i>

Meteorological Observations—Continued

DATE.	Remarks Concerning the Winds and other Aspects of the Weather.				
	Mean Temperature (Fahr.)	Greatest range of Temperature in the week.	Average Humidity, saturation being 100.	Total Rain-fall (inches of water.)	Mean pressure of the Atmosphere.
Week ending—					
December 5.....	32	23-50	63	1.10	29.82
December 12.....	28	16-41	60	1.20	29.80
December 19.....	29	13-45	63	.45	29.96
December 26.....	27	8-46	61	.19	29.08
Five days ending Dec. 31.....	22	22-40	70	.17	29.17
Average for 4 weeks and 5 days.....	30	8-50	63	3.11	29.95
Average for the year.....	50	-5-102	68	64.25	30.00

Variable skies and fresh winds characterized the entire week. A snow-storm from 11 a. m. to 8 p. m. of the 6th; about five inches of snow.
A cloudy week, with variable skies and moderate winds. Heavy snow and rain-storm on the 7th.
Mostly clear, with cool fresh winds and light rain.
A clear, cool week, with fresh winds and variable skies. Light, freezing rain on the 20th.
Light sleet, snow and hail-storm on four days. The remainder hazy and foggy.
The mean temperature of this December was nearly 5° colder than the average of 25 years ending December, 1850, and 3° warmer than the corresponding month last year.
The mean temperature of the year was 1.93° lower than the mean of 25 years. The total rain-fall was nearly 18 inches greater than the average of 25 years.

Appended Statement No. II. Vital Statistics of Hospitals and other Benevolent Institutions of the City and County of New York.*

NAME OF INSTITUTION.	Present Capacity—Number of Beds.	Total Admissions in the year.	Total Number of Cases that received care in the Institution.	NATIVE BORN.		FOREIGN BORN.		DEATHS.				Death-rate per 1,000.	Percentage of Mortality on Total.	REMARKS.
				Males.	Females.	Males.	Females.	Deaths.						
								Native Males.	Native Females.	Foreign Males.	Foreign Females.				Total Deaths.
<i>Hospitals.</i>														
New York Hospital.....	500	2,386	2,607									2.94	9.95	There were 69 coroner's inquests held upon patients who died in this Hospital during the year; 1,374 seamen were admitted during the year, of whom 84 died.
Bellevue Hospital.....	830	6,304	7,038	1,120	800	2,874	1,056	137	110	354	105	765	11.22	Excluding the casualty and other cases of sudden death which were referred to coroners (280), and also excluding the deaths by consumption (300), the death-rate in this Hospital was 51.13 in 1,000, or 5.41 per cent of total treated.
St. Luke's Hospital.....	180	802	936									106	11.32	The total number of "charity-beds" is now 55. The total expenses in the year amounted to \$30,084, or \$43 for each patient. The year closes on St. Luke's day, October 1-11.
St. Vincent's Hospital.....	150	725	903	52	50	344	358	6	5	40	34	91	11.32	There were 45 deaths by consumption, and 18 by other incurable chronic diseases, in this Hospital during the year.
Mount Sinai Hospital.....	81	671	1,414	159	92	753	421	5	3	33	8	48	21.20	There were 9 deaths by consumption and 22 by casualties and various kinds of violence. The daily average of patients was 531.
Women's Hospital.....	73	151	380		921		139		3		2	5	13.16	The daily average number of patients in this Institution during the year was 60. The patients were received from 15 States and Territories.

* These condensed statistics of hospitals and other institutions in which medical service is systematically provided, are necessarily incomplete, but these will incite to greater effort to place the vital records of such service upon a uniform and proper basis, or, at least, to a basis which will admit of instructive and useful comparisons. Such statistics, when faithfully kept, will contribute to the economy and improved administration of our medical and other charities. They will, as Florence Nightingale has said, "enable us to ascertain how much of each year of life is wasted by illness—what diseases and ages press most heavily on the resources of particular hospitals." Hospital hygiene, and the questions of social and financial economy connected with these great charities, call for the most rigid inquiry into this class of vital statistics.

E. HARRIS.

Hospitals and other institutions on Blackwell's Island.									
Alma House.....	1,170	9,303	4,135	103	555	1,375	1,170	355	8.40
Penitentiary.....	1,736	1,645	2,132	673	61	1,058	1,034	10	4.70
Charity Hospital.....	1,266	5,756	6,616	670	800	2,104	9,138	449	67.50
Small-Pox Hospital.....	50	218	213	22	23	75	83	15	70.42
Fever Hospital.....	100	167	174	41	10	43	64	20	224.14
Lunatic Asylum.....	600	668	1,580	183	286	309	787	135	55.49
Blind Asylum.....	100	55	102	6	9	90	18	4	30.30
Infants' Hospital.....	1,577	1,562						1,000	550.61
Epileptic and Paralytic Hospital.....	136	188	273	45	65	102	63	20	50.08
Hospital for Insane.....	136	101	175	7	9	33	59	45	314.20
Total.....	4,196	12,822	17,310	1,937	1,507	4,035	4,769	1,503	104.19
Nursery and Nursery Hospital on Randall's Island.									
Nursery Hospital.....	942	704	530					20	33.76
Nursery Department.....	531	1,794	2,429					2	82.09
House of Refuge.....	1,000	740	1,745					13	7.45
Total.....	1,576	3,237	5,103					45	8.31
Hospitals and other institutions, Ward's Island.									
N. Y. State Emigrant Hospital.....	638	7,139	8,128					709	72.50
Emigrant Refuge.....	1,000	4,374	3,792						
Total.....	2,220	11,513	11,920						

This Institution is now located on Ward's Island.

Of the deaths, 157 were native and 516 foreign. There were sent to this Institution 29 patients, from steamers, of whom 4 died, and 17 remaining vessels of whom 3 died, being a total of 7 deaths to the 99 admissions for the year. Of the admissions during the year, 5,360 were males and 3,098 females.

Organized July, 1908. The necessary steps have been taken to make this an incorporated institution.

Of the whole number treated, 3,093 were males, 6,922 females, 6,378 native, 4,092 foreign born, 4,546 were children, 6,324 adults, 3,529 were attended at their homes and 2,857 at the dispensary; 213 were vaccinated.

This Dispensary deals largely with scrofulous children. It is now an incorporated institution.

Established in May, 1898. The statement includes the number of cases of disease actually treated from May to December.

A charitable institution for the purpose of giving advice and treatment to the poorer classes who wish to take care of their teeth. The total number of operations of all kinds during the year was 3,285. The infirmary has 19 chairs for operative dentistry, and a laboratory to accommodate 100 students

	395	70	73	48	110	2	3	4	13.50	1.30
ary	212	47	30	51	76					
ic College	6,912	1,779	2,903	1,206	1,024	4	2	3	14	2.63
ic Dispensary	10,660								39	3.50
ic Dispensary	90	123	33	51	11	4	1		1	8.13
Dispensary for Diseases of the Eye	245	38	47	57	62					
Infirmary of the N.Y. Coll. of Dentistry	1,322	251	631	149	321					
Total	144,512								4.44	.41

Reformatory Institutions.

House of the Good Shepherd	316	296						4	7.46	.75
House of Protection (Inst. of Mercy)	104	303	2,968	88	210	1		1	3.25	.32
House of Mercy	45	68	114	32	35	1	1	2	17.54	1.75
Midnight Mission	15	104	122	70	46					

The Sisters of the Good Shepherd number 97, of whom 11 are engaged in forming a foundation of the order in Boston, and 6 are founding another in Brooklyn. Of the number who received care in the institution during the year, 12 were sent to their homes, 27 provided with situations, 4 died. On the 31st December, 1909, there were 413 Magdalenas remaining in the House. The whole number received since the organization of the institution is 1,596.

The number who received care includes those admitted to the institution, as well as those who were lodged without and assisted by money, food and clothing.

This institution was founded by the efforts of the late Mrs. Richmond, for the rescue of prostitutes.

Organized January, 1860; incorporated July 7th, 1890.

At the beginning of 1908 there were 17 inmates in the institution, making the total number that received care 130. Of these, 41 were sent to kindred institutions, 34 resorted to friends, 30 placed in respectable situations, while 21 returned to a life upon the street; 11 remained in the House January 30, 1909.

Other Humane Institutions.

N. Y. Orphan Asylum	250	16	201	100	92	3	3	1	1	1	9	9.85	.99
Roman Catholic Orphan Asylum	1,070	134	1,017	503	419	63	37	3	4	...	7	6.80	.00
St. Joseph's Asylum	500	44	227	66	53	18	71	1	...	2	3	13.32	1.32
Protestant Half Orphan Asylum	240	84	315	19	19	32	19	...	...	1	2	10.47	1.65
Hebrew Orphan Asylum	200	44	191	110	33	36	13	...	...	...	1	7.94	.79
Leake & Watts Orphan Home	300	19	120	66	42	4	14	1	...	...	...	...	...
Home for Respectable Aged and Indigent Females	100	91	91	...	46	...	45	...	...	...	...	...	...
Colored Home	300	52	297	223	276	23	4	50	55	6	111	130.97	13.53
N. Y. Institution for the Blind	185	42	179	87	67	4	1	1	...	1	2	11.17	1.15
Home for Incurables	30	22	41	11	10	0	7	1	5	1	5	10.27.97	28.73
Colored Orphan Asylum	55	55	322	26	16	...	...	...	...	...	2	7.53	.76
Ladies' Women Aid Society	71	50	80	9	57	1	20	1	5	...	7	67.59	8.75
N. Y. Institution for the Instruction of the Deaf and Dumb	400	103	515	256	213	28	24	1	1	...	9	3.66	.37
N. Y. Juvenile Asylum and House of Reception	700	551	1,422	1,076	200	99	49	2	2	...	4	2.79	.93
Female Christian Home	30	69	73	...	49	...	15	...	...	...	...	...	...
Presbyterian Home for Aged Women	30	13	20	...	10	...	30	...	3	...	4	137.53	13.33
Samuelson Home for the Aged .....	...	10	4	...	19	4	14	1	1	...	4	53.32	5.33
Society for the Relief of Half Orphans and Destitute Children	240	67	310	19	20	28	21	...	...	...	...	...	...
St. Luke's Home	31	64	21	...	12	...	19	...	2	...	6	103.55	10.55
St. Barnabas Home	50	2,250	3,116	245	867	4	1,124	1	...	...	1	.32	.63
Sheltering Arms	91	27	118	51	53	6	8	...	...	...	...	...	...

Including Male Department in Fifth Avenue and Female Department in Prince Street.

No deaths occurred during the year 1892.

Supported exclusively by a fund left by Messrs. Leake and Watts. The Institution has ample schools, dining rooms and dormitories for the accommodation of 300 children.

This charity, now in its twenty-ninth year, consists of a home and a hospital, which humanely provides for a class of very needy invalids.

Supported entirely by voluntary contributions. All classes of disease are received, the infectious only excepted. The death-rate is high, from the fact that most of the cases are hopeless when received, as the name and object of the institution would indicate.

The average age of the deceased was 75 years.

The actual number of pupils now in the Institution is 250.

A large number, received for a day or two and kept until they found situations, are not included in the statement of the number admitted during the year.

This is a new Institution for aged and homeless men and women of all Protestant denominations. It was opened for women in 1893 and for men in 1895. It is entirely dependent upon public charity.

The whole number of children provided for since the opening of the Institution is 2,524.

St. Barnabas Home is a temporary home for women and children. During the year 17,503 lodgings and 72,519 meals were furnished, and 683 women provided with situations.

No account is here made of any but children.

Vital Statistics of the Hospitals and other Benevolent Institutions of the City of Brooklyn and Vicinity.

[Reported by Dr. R. C. Spruzs, Deputy Registrar.]

NAME OF INSTITUTION.	Present Capacity—Number of Beds.	Total Admissions in the year.	Total Number of Cases that received care in the Institution.	NATIVE BORN.		FOREIGN BORN.		DEATHS.				Death-rate per 1,000.	Percentage of Mortality on Total.	REMARKS.
				Males.	Females.	Males.	Females.	Native Males.	Native Females.	Foreign Males.	Foreign Females.			
Kings County Hospital.....	445	9,464	2,789	308	270	1,151	1,056	99	41	101	75	94.38	8.36	Located at Flatbush; under control of Superintendents of the Poor.
Kings County Almshouse.....	471	.....	2,376	187	277	600	1,312	10	17	.....	1	11.78	1.18	Located at Flatbush; under control of Superintendents of the Poor.
Brooklyn City Hospital.....	240	1,912	1,492	473	50	904	55	95	2	51	10	50.39	5.94	Under control of 25 trustees; receiving no contagious diseases; recent surgical cases treated gratuitously.
Brooklyn Eye and Ear Hospital.....	7	983	983	347	196	211	230	.....	.....	.....	.....	.....	.....	Founded April 15, 1868. Located
Kings County Asylum.....	532	231	730	60	41	91	96	14	10	15	13	78.70	7.37	Recently much enlarged and forced ventilation introduced. Controlled by the Superintendents of the Poor to Kings county.
Queens County Almshouse.....	100	.....	505	120	109	307	119	1	.....	4	3	14.16	1.43	Located at Flatbush; has been recently greatly enlarged; will receive double its present number of inmates.
Kings County Nursery.....	221	519	656	450	339	44	73	24	19	.....	1	46.49	4.69	For females only. Location corner Congress and Clinton streets.
St. Paul's Roman Catholic Orph. Asy.	525	76	573	.....	559	.....	15	.....	9	.....	.....	15.70	1.57	A reformatory institution; governed by Common Council; located near Flatbush.
Trust Home.....	100	114	209	69	5	10	.....	.....	.....	.....	.....	.....	.....	Located in Cumberland street, near Myrtle avenue.
Brooklyn Orphan Asylum.....	122	65	190	.....	63	.....	.....	.....	.....	.....	.....	10.96	1.03	Located in Butler street, near Flatbush avenue.
Home for Destitute Children.....	96	72	142	73	.....	.....	.....	1	1	.....	.....	20.96	2.10	Located in Albany avenue, near Hartman street; a charity of the Episcopal church.
Church Charity Foundation.....	75	15	89	89	95	4	13	.....	.....	.....	9	25.00	2.50	Provision exists for 25 aged females and 50 children. Wash- ington avenue, near Lafayette street.
Graham Institution.....	80	7	64	.....	43	.....	6	.....	2	.....	5	139.02	12.96	Corner of Congress and Hicks streets. A Roman Catholic charity.
St. Peter's Hospital.....	50	430	640	81	17	73	319	6	2	30	37	134.53	12.45	
L. I. College Hospital.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	3,172	6,307	11,875	.....	.....	.....	.....	.....	.....	.....	564	48.30	4.53	

Appended Statement No. IV.

List of Clergymen and Magistrates who solemnized Marriages in the City of New York, with the Number of Returns certified and forwarded to the Bureau of Vital Statistics by each one during the year 1868.

NAME.	No. of returns.	NAME.	No. of returns.
Rev. John Q. Adams.....	14	Rev. Adam Cleghorn ...	12
William Adams	7	Howard Crosby.....	8
Charles C. Adams.....	8	William H. Clark	6
Thomas D. Anderson.....	6	William H. Clowry.....	22
Samuel D. Alexander	6	John Crawford.....	6
Edward Anthon.....	1	N. E. Cornwall	7
Matthew T. Adam.....	2	A. J. Conklin	6
John Arroll	2	S. Caro.....	4
Lyman Abbott.....	2	Samuel Cooke.....	11
E. R. Atwater.....	2	Thomas K. Conrad	2
G. W. Archibald.....	4	Toliver F. Caskey	6
Samuel Adler	25	Thomas J. Cox.....	2
Moses Aaronson.....	4	Samuel T. Carter.....	1
M. Apt.....	8	David B. Coe	1
J. E. Annan.....	5	Henry B. Chapin.....	1
Henry Angell	7	James K. Campbell.....	1
Thomas Armitage.....	4	William H. Cooke.....	1
J. P. Appleton.....	1	N. W. Conckling.....	4
Frederick Brown.....	42	B. F. DeCosta.....	3
S. D. Brown.....	19	G. W. Drees	146
Hugh H. Blair.....	47	Morgan Dix	32
J. H. Baden.....	69	Henry Davies.....	9
John F. Busche.....	72	Thomas DeWitt	4
Seymour A. Baker	12	William Dodge, Police Justice.....	10
Adolphus Berckmann.....	93	Joseph Dowling, Police Justice.....	10
Urban C. Brewster.....	4	Rev. Cornelius R. Duffie.....	9
R. J. W. Buckland.....	5	A. J. Donnelly	85
Eastburn Benjamin.....	1	H. De Luyne.....	46
Christopher L. Briggs.....	4	Michael Driscoll	4
S. D. Burchard	32	J. Daubrese.....	7
C. Battersbury	6	George P. Draper	7
J. B. Barretta.....	91	George Dubois	7
F. Bottome	12	William Dymond	2
S. Bourne	3	Thomas K. Dawson.....	11
Robert R. Booth.....	3	R. Deisher.....	22
John Henry Brodt.....	6	Charles F. Deems.....	6
Abbott Brown.....	4	Samuel D. Denison.....	1
T. C. Benning	1	John Dowling.....	33
Theodore Brohm	1	William H. Dikeman.....	9
William F. Butler.....	11	William F. Dixon	1
Martin I. Berger.....	2	Henry S. Day.....	4
Milton Badger.....	1	Walter Deafield	8
Anthony Becker.....	6	Thomas Davis.....	1
John P. Betker	1	Ferdinand C. Ewer.....	15
Henry W. Bellows	2	Theodore A. Eaton.....	8
C. E. Blake.....	1	Moses A. Erdmann.....	16
Thomas Coman, Alderman.....	29	Julius Ehrhart.....	23
Thomas Connors, Alderman	4	William Everett.....	154
Rev. John E. Cookman	41	David Einhorn	19
G. Campbell.....	30	Samuel Eokstein	6
K. H. Chapin.....	10	O. Elherson	10
John W. Chambers.....	6	John Eschmann.....	2
Sam T. Clarke.....	3	John A. Foersch.....	432

NAME.	No. of returns.	NAME.	No. of returns.
Rev. William McFarland	1	Rev. John L. See	1
George D. Matthews	5	George W. Stewart	8
H. C. Macdonald	17	J. R. W. Sloane	5
John N. McLeod	2	Thomas Street	0
J. L. McNair	4	Charles A. Stoddard	5
William Morris	1	J. W. Shackelford	5
Alexander McLean	24	Erastus Seymour	7
William K. Newell	16	Charles B. Sing	44
M. Nicot	20	Edward Shandley, Police Justice	5
Charles C. Norton	14	Rev. Walter A. Sterling	2
Charles Nanz	4	C. E. Swope	3
H. D. Northrop	11	M. C. Sutphen	4
John H. Oerter	24	Marcus Schwalbe	11
Frederick Ogilby	7	H. M. Schaffer	2
Samuel Osgood	4	Wolf Schriek	1
James O'Leary	37	Michael Schwerin	7
William O'Connor	4	George H. Sheldrake	1
Henry H. Oberly	3	Thomas H. Skinner, Jr.	8
Elbert Osborn	16	John Floyd Steen	6
R. C. Putney	30	William T. Sabine	6
Henry C. Potter	5	J. H. Sinclair	1
Bernhard Pick	13	L. Sternberger	4
Joseph H. Price	5	A. H. Sanford	6
Thomas R. Peters	8	J. Howard Smith	2
Charles H. Payson	6	Cornelius B. Smith	4
William R. Paxton	2	Theodore Seibt	10
John Peterson	18	G. Henry Smith	1
William H. Pendleton	12	S. H. Sonneschein	8
George L. Prentiss	4	William Starrs, Vicar-General ..	11
John L. Peck	30	R. C. Shimeall	1
Charles E. Phelps	3	S. E. Stevens	1
William A. Phillips	16	J. Tuttle Smith	3
L. Phillips	7	William J. Seabury	1
Thomas S. Preston	15	C. Schmidt	2
Reuben J. Parsons	60	Henry Toolke	320
George H. Pool	24	Stephen H. Tyng, Sr.	15
Richard Parker	3	Stephen H. Tyng, Jr.	6
John Parker	21	Isaac M. Tuttle	2
Richard P. Post	1	Alexander P. Thompson	10
J. M. Pullman	2	Joseph P. Thompson	14
Leonard Patterson	16	John Thompson	3
R. G. Quennell	23	James Thompson	12
D. McL. Quackenbush	10	John W. Trimble	5
Isaac Reilly	3	Theodore Thiry	3
M. Roehots	9	A. F. Tonner	24
William Ross	1	S. M. Tracey	20
Henry C. Riley	4	Henry Trumpp	7
Frederick Repper, Alderman	1	Moritz Tintner	2
Theodore Ritter, Notary Public	1	Morris A. Tyng	1
Rev. Henry Raeger	224	Francis Vinton	2
Morse Rowell	20	Alexander H. Vinton	7
Henry F. Roberts	1	Antoine Verren	20
William Roberts	5	F. B. Van Kleeck	19
Ebenezer P. Rogers	7	Abraham Van Houton	8
Christopher S. Rhodes	29	Thomas E. Vermilye	5
A. A. Reinke	1	Henry Vidaver	6
William Reid	13	Albert D. Vail	25
C. F. E. Stohlmann	43	Enoch Van Aken	2
Charles Schramm	188	Rudolph Wieszorek	66
Gottfried Scheibel	182	Levi S. Weed	93
William A. Scott	33	George W. Woodruff	33
Uriah Scott	20	Richard Wilson	2
Peter Stryker	6	William R. Williams	2
William Spelman	32	Louis Wallon	12
Andrew Stevenson	5	E. A. Washburn	9
Frederick Sill	74	James D. Wilson	10
Thomas H. Sill	4	Henry Wasserman	55
Julius Seidel	6	Joseph Wasserman	20
C. S. Stephenson	10	Abraham Wormser	35

“K.”

REPORT

ON THE

QUALITY OF THE WATER SUPPLY,

DURING THE YEAR 1868.

[By C. F. CHANDLER, Ph. D., Chemist to the Metropolitan Board of Health.]

To the Secretary of the Metropolitan Board of Health:

Sir—The investigations with regard to the quality of the Croton water supply which were undertaken during the summer of 1867, at the suggestion of Dr. Harris, the Registrar of the Board of Health, have been continued during the past summer and autumn under the authority of the Board, and with the coöperation of General George S. Green, Chief Engineer of the Croton Aqueduct Department.

The samples were taken every fortnight from the hydrant at the School of Mines on Fourth avenue, near Fiftieth street, and from the Distributing Reservoir on Fifth avenue. The results fully justify the high reputation for purity which this water enjoys. Table I exhibits the impurities contained in one United States gallon of two hundred and thirty-one cubic inches of water, including the

1st column, inorganic matter.

2d column, organic and volatile matter.

3d column, total solids, dried at 260° F. or 130° C.

4th column, oxygen required to oxidize the organic matter.

The quantity of oxygen required to oxidize the organic matter is considered the best measure of its injurious character, as the organic matter is supposed to be injurious in proportion as it is ready to undergo decomposition. In Dr. Letheby's reports of analyses on London waters, made to the Metropolitan Association of Medical Officers of Health, this oxygen is supposed to represent eight times its weight of oxidable organic matter, and is so reported.

I consider this estimate excessive, and as it is a mere assumption, prefer to report the oxygen directly.

In Table II the results contained in Table I are given in parts in 100,000 parts of water, for comparison with the water of other cities, where the U. S. gallon is not employed.

TABLE I.

Results of Examinations of Croton Water made during the Summer of 1868.
GRAINS OF IMPURITY IN ONE U. S. GALLON OF 231 CUBIC INCHES.

DATE.	Source of Water.	Inorganic Matter.	Organic and Volatile Matter. Less by Ignition.	Total Solids, Dried at 266° F. 120° C.	Oxygen required to Oxidize Organic Matter.
July 23....	Hydrant, School of Mines.....	3.65	1.17	4.82	.....
do 23....	Reservoir, Fifth Avenue.....	4.23	1.24	5.47	.....
August 6....	Hydrant, School of Mines.....	3.63	1.14	4.87	.073
do 8....	Reservoir, Fifth Avenue.....	3.34	1.40	4.74	.083
do 19....	Hydrant, School of Mines.....	3.05	1.22	4.27	.083
do 19....	Reservoir, Fifth Avenue.....	3.15	.99	4.14	.100
September 2....	Hydrant, School of Mines.....	3.24	.99	4.23	.107
do 2....	Reservoir, Fifth Avenue.....	2.94	1.33	4.30	.100
do 17....	Hydrant, School of Mines.....	3.10	1.00	4.10	.100
do 17....	Reservoir, Fifth Avenue.....	3.27	1.05	4.32	.120
October 1....	Hydrant, School of Mines.....	3.15	1.11	4.26	.107
do 1....	Reservoir, Fifth Avenue.....	2.90	.99	3.89	.107
Average for Three Months.....		3.31	1.14	4.45	.098

TABLE II.

Results of Examinations of Croton Water made during the Summer of 1868.
RESULTS CALCULATED FOR 100,000 PARTS OF WATER.

DATE.	Source of Water.	Inorganic Matter.	Organic and Volatile Matter.	Total Solids.	Oxygen required to Oxidize Organic Matter.
July 23....	Hydrant, School of Mines.....	6.25	2.01	8.26	....
do 23....	Reservoir, Fifth Avenue.....	7.25	2.12	9.37	....
August 6....	Hydrant, School of Mines.....	5.72	2.13	7.85	.125
do 6....	Reservoir, Fifth Avenue.....	5.72	2.40	8.12	.142
do 19....	Hydrant, School of Mines.....	5.22	2.10	7.32	.142
do 19....	Reservoir, Fifth Avenue.....	5.40	1.69	7.09	.171
September 2....	Hydrant, School of Mines.....	5.55	1.70	7.25	.183
do 2....	Reservoir, Fifth Avenue.....	5.04	2.36	7.40	.171
do 17....	Hydrant, School of Mines.....	5.31	1.70	7.01	.171
do 17....	Reservoir, Fifth Avenue.....	5.60	1.89	7.40	.206
October 1....	Hydrant, School of Mines.....	5.40	1.91	7.31	.183
do 1....	Reservoir, Fifth Avenue.....	4.93	1.70	6.63	.183
Average for Three Months.....		5.66	1.97	7.63	.168

From these analyses it will be seen that the entire amount of impurities in the Croton water for the past summer has averaged only 4.45 grains per gallon, or 7.63 parts in 100,000.

Very little change has taken place in the Croton water during the past year. This is seen on comparing the results for the past summer with those obtained the year previous. For thirteen weeks during the summer of 1867, the water was analyzed weekly from three different localities: the hydrant* at the School of Mines, the Reservoir on Fifth avenue and the Reservoir in Central Park. The results of the examination were published in the annual report of the Metropolitan Board of Health for 1867.

TABLE III.

Comparative Purity of Croton Water during the Summer of 1867 and 1868.

1. GRAINS OF IMPURITY IN ONE U. S. GALLON.

	Summer of 1867. Average of 39 Analyses.	Summer of 1868. Average of 12 Analyses.
Inorganic matter.....	3.90 grains.	3.31 grains.
Organic and volatile matter	0.66 do	1.14 do
Total solids.....	<u>4.56</u> do	<u>4.45</u> do
Oxygen required to oxydize the organic matter	<u>0.1055</u> do	<u>0.098</u> do

2. RESULTS CALCULATED FOR 100,000 OF WATER.

	Summer of 1867. Average of 39 Analyses.	Summer of 1868. Average of 12 Analyses.
Inorganic matter.....	6.72 parts.	5.66 parts.
Organic and volatile matter	1.12 do	1.97 do
Total solids.....	<u>7.84</u> do	<u>7.63</u> do
Oxygen required to oxydize the organic matter.....	<u>0.1809</u> do	<u>0.1680</u> do

In Tables IV and V are given the result of the examination of water taken from the more important brooks and ponds which flow into the Croton river; the fountain heads of the Croton supply. They were collected in October, during the excursion which I had the pleasure of making with Gen. G. S. Green, Chief Engineer of the Croton Aqueduct Department; Dr. Elisha Harris, Registrar of Vital Statistics, and Mr. Worthen, Engineer of the Metropolitan Board of Health, for the purpose of examining the water shed or valley of the Croton River and its tributaries.

TABLE V.

Sources of the Croton Water Supply.

RESULTS CALCULATED FOR 100,000 PARTS OF WATER.

Number.	SOURCE OF WATER.	Inorganic Matter.	Organic and Volatile Matter.	Total Solids.	Oxygen required to Oxidize Organic Matter.
		Grains.	Grains.	Grains.	Grains.
1...	Beaver Dam Brook, near Katona.....	8.03	0.78	8.81	.1620
2...	Cross River, near Katona	6.13	0.65	6.78	.1512
3...	Croton River, main stream one mile west of Katona Station.....	6.25	0.68	6.93	.1089
4...	Tittious River, near Purdy's Station	9.19	1.22	10.41	.1404
5...	Croton River, Western branch near bridge at Croton Falls.....	5.62	1.08	6.65	.1188
6...	Croton River, main Eastern branch, at Croton Falls.	9.20	1.13	10.33	.1242
7...	Croton River, main Eastern branch, near Dr. Forest's corner	9.83	1.19	10.92	.1350
8...	New Dam, Reservoir E.....	6.20	1.21	6.41	.1901
9...	White Pond Brook, or Wright's Brook, near Reservoir E.	5.45	0.88	6.29	.0972
10...	Black Pond Brook, near Reservoir E.....	4.81	1.08	5.89	.2375
11...	Black Pond	4.83	1.67	6.50	.3456
12...	Cold Spring Brook, flowing into Black Pond.	2.06	1.83	3.89	.4320
13...	White Pond, one mile above Millerton.....	3.32	1.51	4.83	.1404
14...	Glencida Pond Outlet	5.40	0.92	6.32	.1620
15...	Musscot Creek, near the head of Croton Lake	8.06	0.89	8.95	.1404
16...	Croton Lake at its head	7.41	1.16	8.57	.1512
17...	Kisco Brook, at Croton Lake.....	6.45	0.89	7.32	.1890
18...	Croton Lake at the Dam.....	7.42	1.13	8.55	.2332
	Average of the Eighteen Samples.....	6.36	1.10	7.46	.1809
	Average for the Summer in the City	5.88	1.97	7.83	.1680

The difference in purity shown by these waters was not unexpected, as some of the brooks rise high up among the hills, and pour down over pebbly beds to the main stream, while others have their origin in swamps and flow sluggishly along beneath the shadows of the swamp maple and the sumach. All are, however, remarkably pure.

In Table VI is shown the comparative quality of the water used in several large cities in the United States and Europe. It will be seen that the Croton water compares favorably with the best waters on the list. It is unfortunate that the same cannot be said of the two or three hundred wells now in use in the cities and villages of the Metropolitan District, most of which are heavily charged with organic matter, derived from infiltrating sewage. Such waters are ready, under favorable conditions, to develop cholera and other fatal diseases. Two of these are mentioned in the table for comparison. It is to be hoped that the time is not far distant when every inhabitant of New York island will be supplied with the health giving Croton, and every citizen of Brooklyn with the equally wholesome

Ridgewood. No single improvement can contribute more towards the prevention of cholera and similar diseases. Let every well be filled up, that the people may be no longer compelled by ignorance or necessity to drink the soakage of the soil, which is always polluted in the neighborhood of human habitations.

TABLE VI,
Showing the Parity of Croton Water as Compared with the Waters of Other Cities.
RESULTS CALCULATED FOR 100,000 PARTS OF WATER.

CITIES SUPPLIED.	Source of Water.	Inorganic Matter.	Organic and Volatile Matter.	Total Solids.
New York.....	Croton: Average for three months, 1868 (C. F. Chandler).....	5.66	1.97	7.63
New York.....	Croton: Average for thirteen weeks, 1867 (C. F. Chandler).....	6.72	1.12	7.84
New York.....	Well west of Central Park (No. 1.), C. F. Chandler.....	66.90	7.90	74.80
New York.....	Well west of Central Park (No. 2), C. F. Chandler.....	69.10	3.40	72.50
Brooklyn.....	Ridgewood: average for three months, 1868 (C. F. Chandler).....	3.91	1.43	5.34
Boston.....	Cochituate..... (E. N. Horsford)	4.12	1.22	5.34
Philadelphia..	Fairmount, Schuylkill..... (E. N. Horsford)	3.95	2.06	6.01
Philadelphia..	Delaware..... (H. Wurtz)	4.97	1.06	6.05
Albany.....	Hydrant..... (E. N. Horsford)	14.52	3.96	18.48
Troy.....	Hydrant..... (W. Elderhorst)	10.44	2.30	12.74
Utica.....	Hydrant..... (C. F. Chandler)	9.43	1.64	11.07
Syracuse.....	New Reservoir..... (C. F. Chandler)	20.81	3.08	23.89
Cleveland.....	Lake Erie..... (J. L. Cassels)	8.13	2.62	10.75
Chicago.....	Lake Michigan..... (J. V. Z. Blaney)	9.63	1.81	11.44
Rochester.....	Genesee River..... (C. F. Chandler)	20.62	2.12	22.74
Schenectady..	State Street Well..... (C. F. Chandler)	80.38	4.00	84.38
Newark.....				
Jersey City..				
Hoboken.....	Passaic River..... (E. N. Horsford)	7.85	4.90	12.75
Hudson City..				
Trenton.....	Delaware River..... (H. Wurtz)	5.02	0.95	5.97
London.....	Thames: Grand Junction Co. (Dr. H. Letheby)	26.67	1.43	28.10
London.....	Thames: West Middlesex Co. (Dr. H. Letheby)	22.60	1.21	23.81
London.....	Thames: Southwark and Vauxhall Co. (Dr. H. Letheby)	25.78	1.43	27.21
London.....	Thames: Lambeth Co. (Dr. H. Letheby)	25.86	1.78	27.14
London.....	Thames: Kent Co. (Dr. H. Letheby)	38.21	1.07	39.28
London.....	New River Co. (Dr. H. Letheby)	23.93	0.35	24.28
London.....	East London Co. (Dr. H. Letheby)	26.71	0.71	27.42
London.....	Well, Leadenhall street... (Dr. H. Letheby)	154.98	16.44	171.42
Dublin.....	Lough Vartry, new supply (Apjohn and othrs.)	3.04	2.30	5.34
Paris.....	Seine, above the city (Bussy, Wurtz & Ville)	13.45	1.79	15.13
Paris.....	Reservoir, Montmartre (Bussy, Wurtz and Ville).....	19.72	3.50	21.23
Paris.....	Reservoir, Puy de la Vierge.....		3.21	23.01
Stockholm....	Mälar.....			54.00
Stockholm....	När.....			31.14
Stockholm....				110.00
Amsterdam...				28.44
Amsterdam...				

The results of these investigations, with regard to the quality of the water supply of New York, are eminently satisfactory, as the purity of the water is fully established. No one who has examined the district of 352 square miles which supplies the Croton river will be surprised at this result. Mountains and hills of azoic gneiss receive the rainfall, which is quickly absorbed and filtered by the pure silicious sands and gravels, to gush out in numberless springs, feeding the brooks which bear the sparkling waters to the ponds which serve as natural storage reservoirs. From these flow the large streams, which, by uniting, form the Croton river. This is finally expanded by the dam at the head of the aqueduct, into a broad, deep lake, the *fountain reservoir*, in which the quiet waters deposit the finer sediments, and thus undergo a final purification before they are admitted to the aqueduct.

Nowhere along the streams can anything be found which can render the waters impure. Rugged rocks or bright green pastures generally border them. A few factories have been located at points where the water power was available, but a careful examination failed to reveal any pollution of the water by them.

I avail myself of this opportunity to state that as representatives of the Metropolitan Board of Health, both Dr. Harris, and Mr. Worthen, the Engineer, as well as myself, were deeply impressed with the eminently satisfactory condition of everything connected with the Croton water supply. The condition of the lake and streams, the admirable site selected for the new reservoir, the care taken to prevent pollution of the waters, everything we saw satisfied us that the officers in charge fully appreciate the vital importance of guarding this great element of health, and of supplying it to the million of people residing on New York Island with its native purity undiminished.

I have been assisted in these investigations by Dr. Paul Schweitzer and Dr. H. Endemann.

Very respectfully yours,

C. F. CHANDLER, PH. D.,

Chemist to the Metropolitan Board of Health.

“L.”

THE GAS NUISANCE.

The following testimony, given by Prof. C. F. Chandler, Chemist to the Board, exhibits the facts in relation to the chemistry of gas purification. It was given at the hearing before D. B. Hasbrouck, held at the office of the Board of Health, August 12th, 1868, at which the Metropolitan Gas Company appeared by counsel to request a suspension of order No. 425, dated July 14th, 1868:

Charles F. Chandler, called for the Metropolitan Board of Health, being duly sworn, testifies as follows:

By Mr. Allen:

Q. What is your profession? A. Chemist.

Q. Are you connected with any public institution in this city? A. Yes, sir; I hold the chair of Analytical and Applied Chemistry in the School of Mines of Columbia College.

Q. And also chemist of the Metropolitan Board of Health? A. Yes, sir.

Q. Have you paid special attention to the chemistry of illuminating gas? A. Yes, sir.

Q. From what is illuminating gas prepared? A. Bituminous coal.

Q. What is the composition of Bituminous coal? A. Carbon and hydrogen, with some sulphur and nitrogen, and earthy and silicious impurities which constitute the ash.

Q. How is the gas prepared from the coal? A. By exposing it to a high temperature in retorts of iron or clay.

Q. What are the products of this? A. Coke, tar, ammoniacal liquor and gas.

Q. What becomes of these products? A. The coke remains in the retort; the tar and ammoniacal liquor accumulate in the hydraulic main, and in the condenser and scrubber; the gas passes on to the purifiers.

Q. What is the composition of the gas as it leaves the hydraulic main? A. It contains hydrogen gas, carbonic oxide, and

important ones;) bisulphide of carbon, aqueous vapors; this last group of eight constituents constitute the useless or injurious impurities; I did not mention the hydro-carbons individually; there are a dozen or twenty which I group.

Q. Have you ever visited the works of the Metropolitan Gas Company?

A. Yes.

Q. What process do they use there for purifying the gas? A. The dry lime process.

Q. What is the composition of the lime after it has acted upon the gas?

A. It consists essentially of sulphide of calcium, carbonate of lime, hydrate of lime; and contains small quantities of ammonia, cyanide of calcium, sulpho-cyanide of calcium.

Q. Is that all? A. Except a little tarry matter; may be minute traces of other things, but those are the essential constituents.

Q. What occurs when this spent or useless lime is exposed to the air?

A. The ammonia absorbs carbonic acid, forming carbonate of ammonia; the carbonate of ammonia decomposes the sulphide of calcium, forming the sulphide of ammonium, which is evolved; carbonic acid decomposes sulphide of calcium, liberating sulphuretted hydrogen; oxygen is absorbed with the evolution of heat, and the formation of hyposulphite, sulphite and sulphate of lime. These are the more important reactions.

Q. What is the nature of this gas as to its offensiveness, when evolved in the air? A. The sulphuretted hydrogen and sulphide of ammonium are the predominant constituents of the disagreeable odors evolved by the lime refuse.

Q. The fact is, they produce a disagreeable odor? A. They have a disagreeable odor.

Q. Is this disagreeable odor equally perceptible in all kinds of weather?

A. No; in dry, clear weather, the odors rise rapidly in the air, but in damp, heavy weather, particularly with the wind favorable, the odor will diffuse itself throughout the neighborhood.

Q. Would this lime be equally offensive, if more lime were used for the same quantity of gas? A. It would make a little difference, perhaps, but the odor is not due to over saturation; in fact, the refuse contains fifteen or twenty per cent of unchanged hydrate of lime; consequently it is never over saturated.

Q. Is it possible to prevent the escape of the foul odors from the dry lime process? A. I think not.

Q. We come to another point: Is it necessary to employ the dry lime process for the purification of gas? A. I think not; I know it is not.

Q. What is the wet lime process? A. That is a process in which the lime is mixed with a large quantity of water, to the consistency of cream, and the gas obliged to bubble through it; the chemical reactions are the same as in the dry lime process.

Q. Is that in general use? A. No; I have seen it in use in some places, but I believe it is generally abandoned; it is sometimes used with

the iron process, for the more complete removal of carbonic acid, after the sulphur has been removed by oxide of iron.

Q. What is Laming's process? A. It consists in using a mixture of the hydrated sesquioxide of iron, sulphate of lime, hydrate of lime and sawdust, or some other porous material; the mixture consists of dry slacked lime and sawdust in equal quantities, to which is added, for every pound of lime, one pound of sulphate of iron (copperas), dissolved in water. The mixture is exposed to the air for twenty-four hours, to oxidize the protoxide of iron to the sesquioxide. It then consists of hydrated sesquioxide of iron, sulphate of iron, hydrate of lime, sawdust. In the place of copperas, double the weight of sesquichloride of iron is sometimes used, when the mixture consists of hydrated sesquioxide of iron, chloride of calcium, hydrate of lime, sawdust.

Q. What are the disadvantages of Laming's process? A. It is said to be somewhat more expensive in some cities than the dry lime process; while in other places it is said to be much cheaper.

Q. Has it any advantages? A. It has been claimed by some that the gas suffers slightly in illuminating power, though even if this be true, it could be easily remedied by the use of a larger proportion of cannel coal, or the use of small quantities of Albert or Boghead coal; it is stated, however, by others, that no such loss in illuminating power occurs; Unruh, in Magdeburg, where the process is employed, found that the illuminating power was not all diminished, while the sulphuretted hydrogen was entirely, and the carbonic acid almost entirely, removed, the process being much cheaper than dry lime; it has also been stated that it fails to remove the carbonic acid completely; but should this difficulty occur it can be easily remedied by the use of a little lime after the iron mixture; these are the answers to the disadvantages.

Q. Has it any other advantages? A. The gas passes more readily through the mass—the mixture may be used over and over again—and when it finally becomes useless for purifying gas, may be sold for the extraction of the sulphur it contains; but the most important advantage consists in the entire suppression of the disagreeable smell which is evolved from the dry lime refuse.

Q. Will you describe the iron ore process? A. In the iron ore process, brown hematite or bog iron ore, in coarse powder, is employed to absorb the sulphuretted hydrogen; this substance is an impure hydrated sesquioxide of iron, and has the same action on the sulphuretted hydrogen of the gas as has already been mentioned in describing Laming's process; I am informed that at the new gas works in Berlin, a bog ore from Silesia is employed; it is dried, pulverized, sifted and placed in the purifier either alone or mixed with sawdust; it is cheaper than Laming's mixture; it is regenerated slower at first, but more rapidly afterwards; and its action on the gas increases with use; at Hanover the iron ore of Lunenberg mixed with spent tan-bark is employed.

Q. Is this process in use in this country? A. With slight modifications it is employed at the New York Gas Company's Works on East Twenty-first street.

Q. What are the modifications employed at the New York Gas Works? A. Iron ore on Staten Island is mixed with sufficient quantity of iron turnings, filings or borings, to increase the amount of iron to eighty per cent; the mixture is moistened with ammonia water and exposed to the air, when the metallic iron is rapidly oxydized; when dry it is mixed with about five per cent of charcoal powder; it is then slightly moistened with water and placed in the purifiers in a single layer two feet deep; when the mixture ceases to act upon the gas it is withdrawn and exposed to the air, when it is rapidly regenerated, and may be used over and over again; the mixture now in use at the works has been in use since April 21st.

Q. Is that process effective as a purifier? A. I cannot say of my own knowledge, but have heard no complaints with regard to the quality of the gas.

Q. Does the mixture evolve any disagreeable odor after it has been used? A. I have noticed none; I was there while the material was being taken out of the purifiers and shoveled over; I detected no odor of sulphide of ammonium or sulphuretted hydrogen.

Q. Is it more expensive than the dry lime process? A. I should think not. The ore costs five dollars a ton, and is used again and again, while lime is used but once. I was informed that the New York Company spent from \$18,000 to \$19,000 a year for lime by the old process.

Q. Is this process used by the New York Company patented? A. The combination of ore, iron turnings and charcoal, is covered by a patent. But the use of iron ore, or of the oxide of iron, is not covered by a patent in this country to the best of my knowledge. I would not say decidedly, for I have not consulted the patent records to ascertain, but I think not.

Q. State generally, from your information, what processes are in use in Europe? A. I have learned from numerous authorities that the iron process, either as Laming's process, or as iron ore, is used in most of the large cities of Europe.

Q. To your knowledge have any of the commissioners sent to the Paris Exposition reported? A. Prof. J. Lawrence Smith, Professor of Chemistry in the Medical College at Louisville, and President of the Louisville Gas Company, made a report, which I am informed was printed in the *American Gas Light Journal*, though I have not seen it. I have in my possession a letter from him.

Q. As a matter of information state what he says. A. He states that the oxide of iron process is generally used in all the cities of Europe. I do not like to say whether he says Europe or continent, without glancing at it.

Q. Does this process of purifying gas by iron ore require any complicated apparatus? A. The usual dry lime apparatus. Of course some minor change, but no expensive change in the apparatus is necessary.

Q. Is there any essential difference in the coal employed in this country.

and that employed in Europe, which would make a process which is successful there unsuccessful here? A. I think not. I have analyzed numerous specimens of American coal, and do not remember that there was anything peculiar in their composition. That is, the coal used for gas making. We have a great deal of anthracite, but that is not involved in the question of gas making.

Q. Generally, it is possible to obviate the present nuisance from gas works? A. I think it is.

Q. How? A. By introducing the iron process of purifying.

Q. How long would it take, in any particular gas works, to make the changes necessary—take the Metropolitan Gas works, for instance—how long would it take these to make the necessary changes? A. It is difficult to say how long. Would have to procure their oxides of iron. I should think two or three weeks.

Q. Would it interfere meantime with their manufacture? A. Not at all. Particularly as they have four idle purifiers. They could experiment on those without interfering at all with the four purifiers now employed for the dry lime process.

Q. Are sulphuretted hydrogen gas and the sulphide of ammonium injurious to health? A. They are both poisonous gases.

Q. The question was are they injurious to health? A. They are.

Q. Did you ever know any one to be injured by them? A. One of my assistants was rendered insensible by breathing sulphuretted hydrogen in the laboratory at Union College.

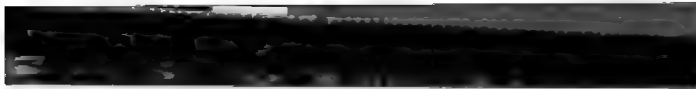
Q. Are all persons equally susceptible to them? A. No; they are not. My instructor in Berlin could not breathe sulphuretted hydrogen without getting the headache at once, while I have never suffered from it. Numerous instances have occurred in which persons have been killed by sulphuretted hydrogen.

Q. Why is sulphur removed from the gas at all? A. Because it produces *sulphurous acid*, the burning of which vitiates the atmosphere; and it also acts upon metal, brass and copper, and would injure the brass fixtures.

Q. Why is the ammonia removed? A. If it is left in the gas it produces *nitrous acid*, which would vitiate the atmosphere.

Q. Why is the carbonic acid removed? A. Because it diminishes the illuminating power of the gas.

Q. Is there any sanitary objection to the carbonic acid gas being allowed to go through the main? A. I should say not; for the reason that the combustion of the perfectly purified gas would produce many times as much carbonic acid as would commonly be contained in it. Consequently the quantity in the gas is a very trifling matter.



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